City of Cambridge
Illicit Discharge Detection and Elimination (IDDE) Program

July 1, 2026

Prepared for:

City of Cambridge, MA

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ABBREVIATIONS

CALM	Consolidated Assessment and Listing Methodology
CCTV	closed-circuit television
cfu	colony-forming unit
City	City of Cambridge, MA
DDT	dichloro-diphenyl-trichloroethane
DPW	Department of Public Works
GIS	geographic information system
GPS	Global Positioning System
IDDE	Illicit Discharge Detection and Elimination
LOS	Level of Service
MassDEP	Massachusetts Department of Environmental Protection
mg/L	Milligrams per liter
mL	Milliliter
MPN	Most probable number
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PCB	polychlorinated biphenyl
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure
SM	Standard Method
SSO	Sanitary Sewer Overflow
SVF	System Vulnerability Factors

SWMP	Stormwater Management Program
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
µS/cm	Micro Siemens per Centimeter

GLOSSARY

Catchment	Area that drains to an individual outfall or interconnection
Dry Weather	No more than 0.1 inches of rainfall has occurred in the previous 24-hour period, and no significant snow melt is occurring
Illicit connection	Any connection to the MS4, or, directly or indirectly, to a watercourse or waters of the United States, that is not authorized and is causing or contributing to an illicit discharge
Illicit discharge	Any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities
Impaired waters	Water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat
Interconnection	The point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States
Outfall	A point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States, and that are used to convey waters of the United States.
Junction Manhole	A manhole or structure with two or more inlets accepting flow from two or more MS4 alignments

Key Junction Manhole	Junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program
Sump Manhole	Manholes with a significant difference in elevation between the bottom of the structure to the bottom of the outlet pipe
SSO	SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health.
Wet Weather	A storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall

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1.0 INTRODUCTION

1.1 MS4 PROGRAM

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the City of Cambridge to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) in Massachusetts, hereinafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management); and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement. This Plan has adapted procedures from guidance documents from the Central Massachusetts Regional Stormwater Coalition, the Center for Watershed Protection, the New England Interstate Water Pollution Control Commission, and the U.S. EPA.

1.2 ILLICIT DISCHARGES

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4), and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or

address, such as a sump pump that discharges contaminated water to a storm drain system on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.

Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows (SSOs) that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor washwater or old household products. In many cases such inappropriate use is due to a lack of understanding on the part of the homeowner.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by outreach in conjunction with the installation of dog waste bins.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 ALLOWABLE NON-STORMWATER DISCHARGES

The following categories of non-storm water discharges are allowed under the MS4 Permit unless the permittee, USEPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4. These authorized discharges to the stormwater system are also defined in the City's Wastewater and Stormwater Drainage Use Regulations.

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising groundwater
- Uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources including discharges from reverse osmosis systems which have their own separate NPDES permits
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- Flows from riparian habitats and wetlands (Per City Regulations)
- De-chlorinated swimming pool discharges
- Street wash waters by methods approved by the City
- Residential building wash waters without detergents
- Discharges or flows from emergency fire-fighting activities

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the IDDE Plan (i.e., the permittee must control these sources, so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 RECEIVING WATERS AND IMPAIRMENTS

Table 1-1 lists "impaired waters" within the boundaries of the City of Cambridge regulated area based on the Final 2022 Massachusetts Integrated List of Waters produced by MassDEP. These are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1 Impaired Waters, Cambridge, Massachusetts

Water Body Name	Segment ID	Integrated List Category[1]/ Designated Water Use[2]	Impairment(s)	Associated Approved TMDL[3]
Charles River	MA72-36	5/Class B	(Fish passage barrier*), (flow regime modification*), (non-native Fish/Shellfish/Zooplankton*), (Water Chestnut*), chlorophyll-a, dissolved oxygen (DO), DDT in fish tissue, E. coli, fish bioassessments, harmful algal blooms, nutrient/eutrophication biological indicators, oil and grease, PCBs in fish tissue, high pH, total phosphorus, sediment bioassays (acute toxicity freshwater), transparency/clarity, unspecified metals in sediment	33826 nutrients 32371 pathogens
Charles River	MA72-38	5/Class B	(Fish passage barrier*), (Flow regime modification*), cause unknown (sediment screening value exceedance), chlorophyll-a, combined biota/habitat bioassessments, DO, DO supersaturation, DDT in fish tissue, E. coli, harmful algal blooms, nutrient/eutrophication biological indicators, odor, oil and grease, PCBs in fish tissue, salinity, total phosphorus, temperature, transparency/clarity	33826 nutrients 32371 pathogens
Alewife Brook	MA71-20	5/Class B	(Debris*), (water chestnut*), chloride, copper in sediment, DO, enterococcus, E. coli, flocculant masses, lead in sediment, odor, oil and grease, PCBs in fish tissue, total phosphorus, scum/foam, sediment bioassays (chronic toxicity freshwater), transparency/clarity, trash	R1_MA_2020_ 5a (nutrients) R1_MA_2019_ 01 (bacteria)
Little River	MA71-21	5/Class B	(Debris*), (water chestnut*), chloride, copper in sediment, DO, enterococcus, E. coli, flocculant masses, lead in sediment, odor, oil and grease, PCBs in fish tissue, total phosphorus, scum/foam, transparency/clarity, trash	R1_MA_2020_ 5a (nutrients) R1_MA_2019_ 01 (bacteria)
Little River	MA71-22	5/Class B	(Debris*), copper in sediment, DO, E. coli, flocculant masses, lead in sediment, odor, oil and grease, PCBs in fish tissue, total phosphorus, scum/foam, transparency/clarity, trash	R1_MA_2020_ 5a (nutrients) R1_MA_2019_ 01 (bacteria)
Miller's River[4]	MA72-31	5/Class B	(Bottom deposits*), (debris*), (habitat assessment*), flocculant masses, odor, oil and grease, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) (Aquatic ecosystems), scum/foam, sedimentation/siltation, turbidity, trash, unspecified metals in sediment	None

Blacks Nook[4]	MA71005	5	(Water chestnut*), nutrient/eutrophication biological indicators, transparency/clarity	None

[1] Category 5 Waters – impaired water bodies that require a TMDL.

[2] Class B – designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. Where designated in 314 CMR 4.06, they shall be suitable as a source of public water supply with appropriate treatment ("Treated Water Supply"). Class B waters shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value.

[3] "Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

*TMDL not required (non-pollutant)

[4]The City currently does not have any outfalls discharging to the Miller's River segment MA72-31, Blacks Nook segment MA71005, or Little River segment MA71-22

1.5 IDDE PROGRAM GOALS, FRAMEWORK, AND TIMELINE

The goals of the IDDE program are to find and eliminate illicit discharges to the MS4 and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition
- Storm system mapping
- Inventory and ranking of outfalls
- Dry weather outfall screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Follow-up screening
- Employee training
- SSO Program Evaluation.

The IDDE investigation procedure framework is shown in Figure 1. The required timeline for implementing the IDDE program is shown in Table 1-2. Each of the components of this program are discussed in further detail in the subsequent sections.

Figure 1-1 IDDE Investigation Procedure Framework

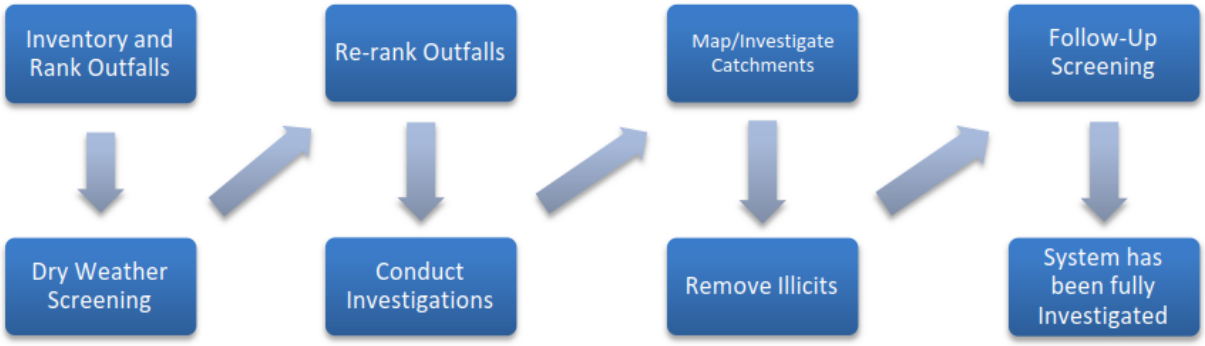


Table 1-2 IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from July 1, 2018 (Effective Date of 2016 Permit)						Status
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years	
Written IDDE Program Plan[1]	X						Complete
SSO Inventory	X						Complete
Written Catchment Investigation Procedure		X					Complete
Phase I Mapping			X				Complete
Phase II Mapping						X	In progress
IDDE Regulatory Mechanism or By-law (if not already in place)				X			Complete
Dry Weather Outfall Screening				X			Complete
Follow-up Ranking of Outfalls and Interconnections				X			Complete
Catchment Investigations – Problem Outfalls					X		Complete
Catchment Investigations – all Problem, High and Low Priority Outfalls						X	In progress

[1]This written IDDE Program Plan must be updated in accordance with milestones of the permit (year 3, year 7, and year 10).

1.6 WORK COMPLETED TO DATE

The 2003 MS4 Permit required each MS4 community to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each

MS4 community was also required to define how confirmed discharges would be eliminated, and how the removal would be documented.

The City has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters
- Adopted an IDDE bylaw or regulatory mechanism (2008)
- Developed procedures for locating illicit discharges
- Developed procedures for locating the source of the discharge
- Developed procedures for removal of the source of an illicit discharge
- Developed procedures for documenting actions and evaluating impacts on the storm drain system subsequent to removal.
- Informed system users of hazards associated with illegal discharges and improper waste disposal.

In addition to the 2003 MS4 Permit requirements, other IDDE-related activities that have been completed include:

- SSO inventory
- Outfall sampling
- Additional storm system mapping, including the locations of catch basins, manholes and pipe connectivity, holding tanks, pump stations, and flush valves
- Trained staff to identify illicit discharges
- Between 1997 and 2002 (prior to the effective date of the 2003 MS4 Permit), roughly 254 illicit connections were identified and removed. During the 2003 MS4 Permit term, an additional 42 illicit connections were identified and removed.
- 318 common manholes were separated in separated catchment areas
- Additional common manholes were separated in combined sewer areas
- The City required private developments to include sanitary sewer holding tanks in combined and separated areas to mitigate any potential impact to CSO flows in combined areas or SSOs in separated areas that experience surcharges within the sewer system

The City has performed IDDE investigations in combined sewer areas currently undergoing sewer separation. Some of these projects include:

- The Cambridgeport neighborhood, which includes the D10 and D12 catchments, discharges to the Charles River at the new Talbot Street outfall. Three illicit discharge sources were identified in the Cambridgeport neighborhood and removed.

- During sewer separation of the DeWolfe Street catchment D21, three (3) illicit discharge sources were identified and removed.

- The Willard Street catchment D30 will discharge to the Charles River via a new stormwater outfall once permitted. No illicit discharges were identified on Willard Street following these investigations.
- The area of Binney Street at Cardinal Medeiros Avenue (Project 9ab) will discharge to the Charles River via catchment D07 once sewer separation is complete. As part of sewer separation work, IDDE investigations are ongoing by DIVCO West and the City. Two (2) illicit discharge sources have been identified at 255 Main Street and 55 Broadway. The illicit discharge at 255 Main Street was eliminated during Year 3 and the illicit discharge at 55 Broadway is scheduled to be eliminated as part of the separation work.
- The Kirkland St area within combined catchment D22 was investigated during 2022. No illicit discharges were identified.
- Fainwood Circle within combined catchment D01 was investigated during 2022. Several potential leaking sanitary laterals were identified.

2.0 AUTHORITY AND STATEMENT OF IDDE RESPONSIBILITIES

2.1 LEGAL AUTHORITY

The City has adopted a Wastewater and Stormwater Drainage System Ordinance; Title 13, Chapter 13.16 (1/28/2008) and the City of Cambridge Wastewater and Stormwater Drainage Use Regulations (3/31/2008). A copy of the ordinance is provided in **Appendix A**. The ordinance provides the City with adequate legal authority to:

- Prohibit illicit discharges (Ordinance 13.16.050, Regulations Article V)
- Investigate suspected illicit discharges (Ordinance 13.16.060; Regulations Article III and Article V)
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system (Ordinance 13.16.020, Regulations Article V)
- Implement appropriate enforcement procedures and actions (Ordinance 13.16.100, Regulations Article VII).

The City will review its current Code of Ordinances, Wastewater and Stormwater Drainage Use Regulations, and related land use regulations and policies for consistency with the 2016 MS4 Permit.

2.2 STATEMENT OF RESPONSIBILITIES

The Cambridge Department of Public Works (DPW) is the lead municipal department responsible for implementing the IDDE program pursuant to the provisions of the Wastewater and Stormwater Drainage System Ordinance and City of Cambridge Wastewater and Stormwater Drainage Use Regulations. The Engineering Division of the DPW will be responsible for day-to-day supervision of the IDDE program and reporting. Other departments or divisions with responsibility for aspects of the program include:

- Sewer Division (DPW) – Maintenance/repairs to the City's MS4
- Water Department – potential use of hydrants during dye testing, leak detection (where high chlorine levels (>1 ppm) are identified in the storm drain)
- Inspectional Services – Enforcement of State Plumbing Code
- Law Department – Ordinance and Drainage Use Regulations, Enforcement
- Information Technology Department – GIS/Mapping
- Traffic, Parking, and Transportation Department – Permits/no parking signs for manhole inspections.
- Cambridge Police Department – Police Details

3.0 STORMWATER SYSTEM MAPPING

The City originally developed mapping of its stormwater system to meet the requirements of the 2003 MS4 Permit. The 2016 MS4 Permit requires a more detailed storm system map than the one required by the 2003 MS4 Permit. The revised mapping is intended to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The City has already completed all Phase I and Phase II mapping requirements. The DPW is responsible for continuing to update the stormwater system mapping based on information collected during the permit term. The City will report on the progress of updates to the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 PHASE I MAPPING

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the following information:

- Outfalls and receiving waters (previously required by the 2003 MS4 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm drain systems
- Municipally-owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA-approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

The City has completed all updates to its stormwater mapping to meet the Phase I requirements. A copy of the existing storm system map is provided in **Appendix B**.

3.2 PHASE II MAPPING

Phase II mapping must be completed within ten (10) years of the effective date of the 2016 MS4 Permit (July 1, 2028) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations
- Municipal Sanitary Sewer System (if available)
- Municipal Combined Sewer System (if applicable).

The City has completed all updates to its stormwater mapping to meet the Phase II requirements, as reflected in **Appendix B** and on the City's GIS viewer (https://www.cambridgema.gov/GIS). The City will continue to update its stormwater mapping to include updates to stormwater infrastructure and further refined catchment delineations based on information collected during future catchment investigations.

3.3 ADDITIONAL RECOMMENDED MAPPING ELEMENTS

Although not a requirement of the 2016 MS4 Permit, the City may include the following recommended elements in its storm system mapping. Most of these elements are already included in the City's GIS viewer and other information will be added as it becomes available.

- Storm drain material, size (pipe diameter), age
- Sanitary sewer system material, size (pipe diameter), age
- Privately owned stormwater treatment structures
- Seasonal high-water table elevations impacting sanitary alignments
- Topography
- Orthophotography
- Alignments, dates and representation of work completed of past illicit discharge investigations (identifies the areas where IDDE work is complete)
- Locations of suspected confirmed and corrected illicit discharges with dates and flow estimates (identifies location of illicit discharges, such as specific buildings).

4.0 SANITARY SEWER OVERFLOWS (SSOs)

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm drain system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

The City has compiled an inventory of SSOs that have discharged to the MS4 within the five (5) years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs. The inventory includes all SSOs that were reported to MassDEP. This includes all SSOs that occurred during wet or dry weather resulting from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for transfer of flow between systems. The SSO inventory is included in **Appendix C**.

The SSO inventory is provided with the Stormwater Management Plan (SWMP) and will be maintained and updated by the City when new SSOs are detected. The SSO inventory will also be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

Upon detection of an SSO, the City will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, the City will follow notification requirements of 314 CMR 12.00 and 314 CMR 16.00.

4.1 NOTIFICATION TO STATE AND FEDERAL AGENCIES (314 CMR 12.00)

Under state regulations 314 CMR 12.00 (Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works), upon becoming aware of an SSO to the MS4, the City is required to provide oral notice to EPA, MassDEP, and others as applicable within 24 hours, and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence.

Table 4-1 Report by Phone within 24 hours (Oral Notice)

Agency	Contact	Requirements
MassDEP	During Business Hours: (978) 694-3215, or 24-Hour Emergency Line: (888) 304-1133	Report all SSO events
EPA	EPA New England: (617) 918-1510, or Northeast Region, Douglas Koopman (617) 918-1747	Report all SSO events
Local Board of Health	Cambridge Public Health Department: (617) 665-3800	Report all SSO events where impacts may occur

Department of Conservation and Recreation	State House Ranger Base: (617) 722-1188	Where DCR beaches or parks are affected
MA Division of Marine Fisheries	Boston/Northeast: (617) 727-3336 x 165	Where shellfish resources may be affected
Drinking Water Resource Managers	Cambridge Water Department Sam Corda, Managing Director: (617) 349-4770	Where drinking water resources may be affected

How to submit a written notice within five (5) calendar days:

- Complete MassDEP Sanitary Sewer Overflow (SSO)/Bypass notification form (**Appendix C**)
- Send Notification Form by Fax:
  - Massachusetts Department of Environmental Protection, Northeast Regional Office, 205B Lowell Street, Wilmington, MA 01887. **Fax: 978-694-3499**, and
  - US EPA Water Technical Unit (OES 04-4), 5 Post Office Square, Suite 100, Boston, MA 02109-3912. Attn: Douglas Koopman. **Fax: 617-918-0747**.

4.2 PUBLIC NOTIFICATION (314 CMR 16.00)

Under state regulations 314 CMR 16.00 (Notification Requirements to Promote Public Awareness of Sewage Pollution), beginning on July 6, 2022 the City is required to notify the public of discharges of certain types of untreated or partially treated wastewater, including discharges that fall into the categories of combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and blended wastewater. SSO events requiring notification under these regulations are anticipated to be rare. Details can be found in the City's CSO Public Notification Plan (https://www.cambridgema.gov/-/media/Files/publicworksdepartment/stormwatermanagement/alertnotice/csonotifications/cityofcambridgema0101974finalcsonotificationplanwattachment.pdf).

5.0 ASSESSMENT AND PRIORITY RANKING OF OUTFALLS

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs, and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 OUTFALL CATCHMENT DELINEATIONS

A catchment is the area that drains to an individual outfall or interconnection. The catchments for each of the MS4 outfalls are delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments were delineated based on topographic contours and mapped drainage infrastructure. As described in **Section 3.0**, initial catchment delineations have been completed as part of the Phase I mapping, and refined catchment delineations will be updated as they become available to reflect information collected during catchment investigations.

5.2 OUTFALL AND INTERCONNECTION INVENTORY AND RANKING

The City completed an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information, which was required within one (1) year from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections. The current ranking including status of investigations is provided in **Appendix D**.

The initial outfall and interconnection inventory identified each outfall and interconnection discharging from the MS4, recorded its location and condition, and provided a framework for tracking inspections, screenings and other IDDE program activities. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

Outfalls and interconnections are classified into one of the following categories:

1. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges are designated as Problem Outfalls. This includes any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:

    - Olfactory or visual evidence of sewage;
    - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or
    - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

Dry weather screening and sampling, as described in Section 6 of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls.

The City has categorized one (1) outfall as a Problem Outfall; D44, Matignon Road. Catchment investigations for D44 were completed during permit year 5.

2. **High Priority Outfalls**: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

    - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds; or
    - Determined by the permittee as high priority based on the characteristics listed in Table 5-1, or other available information.

    The City has categorized 40 outfalls as High Priority Outfalls based on Appendix F of the 2016 Permit. This includes one (1) new outfall, D13, added during Permit Year 5, one (1) new outfall, D30, added during Permit Year 6, two (2) new outfalls, D52_1 and D52_2, added during Permit Year 7, and one (1) new outfall D11B and replaced outfall D51 with two (2) outgoing interconnections IC-51A and IC-51B added during permit year 8. The Permit states that catchments draining to any waterbody impaired for bacteria or pathogens shall be designated either Problem or High Priority. Both the Charles River and Alewife Brook are impaired for E. coli. These outfalls were not designated as Problem outfalls because existing information available at the time the Permit went into effect did not indicate likely sewer input.

    Catchment investigations are complete for 15 high priority outfalls including D03B, D10, D12, D15, D17A, D28, D30, D31, D33, D33A, D38, D46, D50, D52_1, and D52_2.

    Additionally, catchment investigations are in progress for 25 high priority outfalls including D02, D03C, D04, D05, D06, D07, D08, D09, D11, D11B, D13, D15, D16, D18, D19, D21, D25, D27, D34, D36, D40, IC-51A, IC-51B, D53, and D55.

3. **Low Priority Outfalls:** Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed in Table 5-1, or other available information. The City has not categorized any outfalls as Low Priority.

4. **Excluded Outfalls:** Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land. The City has categorized fourteen (14) outfalls and one (1) outgoing interconnection to a DCR outfall as Excluded Outfalls based on this definition. This includes six (6) new outfalls added during Permit Year 5 along the Lechmere Canal including D02A, D02B, D02C, D02D, D02E, and D03E and one (1) new outfall D02F added during Permit Year 6. These new outfalls on the north side of

the canal are serving park areas only with no sanitary infrastructure nearby. Buildings on the north side of the canal have sanitary services toward Rt 28.

In addition, several catchment areas that contain surface runoff only (no storm drain infrastructure) were classified as non-MS4.

Outfalls were ranked into the above priority categories (except for Excluded Outfalls, which may be excluded from the IDDE program) based on several characteristics of the defined initial catchment areas, where information was available. Table 5-1 provides a comparison of recommended characteristics in the 2016 permit against the characteristics analyzed by the City. Characteristics recommended in the Permit were substituted in some cases based on readily available information and based on the City's knowledge of the MS4 and suspected contributions of illicit discharges.

Table 5-1 Outfall Priority Ranking Characteristics

Permit Recommended Characteristics	Cambridge Characteristics
Past discharge complaints and reports	Discharge complaints are related to waterbodies, rather than specific outfalls or addresses that could be attributed to an outfall
Poor receiving water quality – the following guidelines are recommended to identify waters as having a high illicit discharge potential: exceeding water quality standards for bacteria; ammonia levels above 0.5 mg/l; surfactants levels greater than or equal to 0.25 mg/l.	Previous dry weather outfall screening results analyzed (E. coli, ammonia, surfactants). E. coli criteria for Class B water bodies at the time of Permit issuance is: no sample should exceed 235 CFU/100 ml.
Density of generating sites – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.	The City used building density (number of buildings per acre): >6 very high potential, 4-6 high potential, 2-4 medium potential, 1-2 low potential, <=1 very low potential, 0 no potential
Age of development and infrastructure – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.	Age of drainage infrastructure: >40 years very high potential, 20-40 years high potential, 10-20 years medium potential, 5-10 years low potential, <5 years very low potential, non-MS4 no potential
Sewer conversion – contributing catchment areas that were once serviced by septic systems but have been converted to sewer connections may have a high illicit discharge potential.	Not applicable
Historic combined sewer systems – contributing areas that were once serviced by a combined sewer system but have been separated may have a high illicit discharge potential.	Applies to all catchments
Surrounding density of aging septic systems – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.	Not applicable
Culverted streams – any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.	Not applicable
Water quality limited waterbodies that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.	All catchments discharge to water quality limited waterbodies
The permittee may also consider additional relevant characteristics, including location-specific characteristics; if so, the permittee shall include the additional characteristics in its written (hardcopy or electronic) IDDE program.	Linear feet (LF) of drain located immediately under sewer: >750 LF very high potential, 500-750 LF high potential, 250-500 LF medium potential, 100-250 LF low potential, 1-100 LF very low potential, 0 LF no potential
	Linear feet of drain under sewer in close proximity to sewer (within 12 feet or less): >1200 LF very high potential, 900-1200 LF high potential, 600-900 medium potential, 300-600 LF low potential, 1-300 LF very low potential, 0 LF no potential

Within each category (Problem, high priority, and low priority), catchments were further ranked based on an analysis of the characteristics listed in Table 5-1. Each characteristic was weighted as presented in Table 5-2 to calculate a total score/ranking for each catchment area. The intent is to weigh more heavily the characteristics that provide a greater indication/likelihood of illicit discharge potential.

Table 5-2 Weighting of Outfall Ranking Characteristics

Characteristics	Weighting
Building Density	5%
Drain Immediately Under Sewer	25%
Drain Under Sewer in Close Proximity (12 feet or less)	25%
Age of Drain	10%
Average E.coli	35%
Total	**100%**

6.0 DRY WEATHER OUTFALL SCREENING AND SAMPLING

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow. The City is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, based on the initial priority rankings described in the previous section.

6.1 WEATHER CONDITIONS

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. When possible, 48 to 72 hours of dry weather is preferred. For purposes of determining dry weather conditions, program staff will use precipitation data from Hometown Forecasting Services of Nashua, NH (603-204-5430). If Hometown Forecasting Services is not available or not reporting current weather data, then National Weather Service (NWS) will be used as a back-up.

6.2 DRY WEATHER SCREENING/SAMPLING PROCEDURE

6.2.1 General Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking
2. Acquire the necessary staff, mapping, and field equipment (see Table 6-1 for list of potential field equipment)
3. Conduct the outfall inspection during dry weather:
    - Photograph the outfall
    - Record the inspection information and outfall characteristics using a tablet or similar device, to be entered into Cartegraph One application (See form in **Appendix E**).
    - Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.
4. If flow is observed, sample and test the flow following the procedures described in Section 6.2.3.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow.

6. Results from screening and sampling that are entered into the Cartegraph One application will be automatically accessible to City staff with access to Cartegraph. Include pertinent information in the outfall/interconnection inventory and priority ranking.

7. Include all outfall screening and monitoring data collected during the reporting period and cumulative for the permit term in the annual report.

The DPW has undertaken water quality sampling during wet and dry weather conditions to satisfy requirements of the Massachusetts Department of Environmental Protection (DEP) Variance for Combined Sewer Overflow (CSO) discharges to the Alewife Brook, DEP Administrative Consent Order ACOP-96-1004 (Common Manhole Separation), DEP Notice of Non-Compliance NON-NE-00-1004 (Alewife 308 Letter), and EPA's National Pollution Discharge Elimination Program (NPDES) for stormwater (MS4) permit.

Previous outfall screening/sampling conducted under the 2003 MS4 Permit may be used to satisfy the dry weather outfall screening requirements of the 2016 MS4 Permit only if the previous screening and sampling was substantially equivalent to that required by the 2016 MS4 Permit, including the list of analytes outlined in Section 2.3.4.7.b.iii.4 of the 2016 permit. A review of previous outfall screening data revealed that several of the listed analytes were not included. Therefore, the previous outfall screening will not be used to satisfy the 2016 permit requirements.

6.2.2 Field Equipment

Table 6-1 lists field equipment commonly used for dry weather outfall screening and sampling.

Table 6-1 Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Tablet for Electronic Forms	Setup with Cartegraph One application and ability to login
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp with batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, hard hats, and boots at a minimum
GPS Receiver	For taking spatial location data
Distilled water	For use with test kits
Water Quality Meters	Hand-held meters for testing for various water quality parameters. Recommend Hach™ DR/890 for chlorine and YSI™ Pro30 for conductivity, temperature, and salinity.

Equipment	Use/Notes
Test Kits (see Table 6-2)	For ammonia and surfactants. Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria and total phosphorus analysis require sterile containers and preservatives (see **Table 6-5**)).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Traffic Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard-to-reach outfalls and manholes
5-gallon bucket with cover	Disposal of chemical waste
Confined Space Entry Equipment (if needed)	DBI Sali Tripod and retrieval wench; MSA Tripod, rescue wench and material/personal wench; full body harness; 10' ladder; waders; hard hat; air monitoring equipment (Ventis 4 gas meter)

6.2.3 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, samples will be collected and analyzed for the required permit parameters[1] identified in Table 6-2.

Table 6-2 Dry Weather Flow Analysis

Parameter	Analysis Methods
Ammonia	Portable Meter
Chlorine	Portable Meter
Conductivity	Portable Meter
Salinity	Portable Meter
Temperature	Portable Meter

[1] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Parameter	Analysis Methods
Surfactants	Field Test Kit
Indicator Bacteria (E. coli)	EPA Certified Laboratory Procedure (40 CFR Part 136)
Pollutants of Concern[1]	Various

[1]Pollutants of Concern vary by waterbody; see Table 6-3

The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles and field sheets (See **Appendix E** for Sample Labels and Field Sheets.)
2. Put on protective gloves (nitrile/latex/other) before sampling.
3. Collect sample with dipper or directly into sample containers. If possible, collect water from the flow directly into the sample bottle. Be careful not to disturb sediments.
4. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled, except for bacteria sampling.
5. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (See Table 6-4.).
6. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
7. Fill out chain-of-custody form (**Appendix E**) for laboratory samples.
8. Coordinate with Alpha Analytical (Pace Analytical Services Laboratory Network) to pick up samples.
9. Store used test strips and test kit waste/ampules properly in a 5-gallon bucket with a cover, store at DPW, and dispose at a Household Hazardous Waste collection event. Disposal dates are provided on the City of Cambridge website: Household Hazardous Waste Disposal - City of Cambridge, MA; and
10. Decontaminate all testing personnel and equipment.

Most of the outfalls discharging to the Charles River and Alewife Brook are at least partially submerged. In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for observation and sampling and will report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling. In some cases, there may be drain connections downstream of the first structure free of influence from the receiving water. These situations will be reviewed on a case-by-case basis. The City may choose to complete screening at multiple locations, may inspect downstream drain connections through building inspections or may bypass pump the storm drain so it can be inspected.

For the City, indicator bacteria are E. coli, because all outfalls discharge to freshwater. Pollutants of concern applicable to the City are listed in Table 6-3 and vary by receiving waterbody. It should be noted that the City currently does not have any outfalls discharging to the Miller's River Segment MA72-31, Blacks Nook Segment MA71005, or Little River segment MA71-22.

Table 6-3 Monitoring Requirements for Pollutants of Concern

Water Body Segment	Segment ID	Monitoring Requirements	Outfalls
Charles River	MA72-36	Total Phosphorus, Dissolved Oxygen, BOD_5, oil and grease, e. Coli, pH, TSS, temperature	D2, D3B, D3C, D4, D5, D6, D7, D8, D9, D10, D11, D11B, D12, D13, IC-51A, IC-51B, D53
Charles River	MA72-38	Total Phosphorus, Dissolved Oxygen, BOD_5, oil and grease, e. Coli, TSS, specific conductance, temperature	D15, D16, D17A, D18, D19, D21, IC-23, D25, D27, D28, D30, D31, D50, D55
Alewife Brook	MA71-20	Total Phosphorus, Dissolved Oxygen, BOD_5, oil and grease, enterococcus, e. Coli, TSS, Total Copper, Total Lead, temperature, Chloride	D38, D40, D44, D52_1, D52_2
Little River	MA71-21	Total Phosphorus, Dissolved Oxygen, BOD_5, temperature, oil and grease, e. Coli, enterococcus, TSS, Total Copper, Total Lead, Chloride	D33, D33A, D34, D36, D46
Little River	MA71-22	Total Phosphorus, Dissolved Oxygen, BOD_5, temperature, oil and grease, e. Coli, TSS, Total Copper, Total Lead	None
Miller's River	MA72-31	TSS, oil and grease, PAHs	None
Blacks Nook	MA71005	Total Phosphorus, TSS	None

All analysis with the exception of indicator bacteria and pollutants of concern can be performed with field test kits or field instrumentation and are not subject to 40 CFR part 136. Field kits need to have appropriate detection limits and ranges. Table 6-4 lists the field test kits and field instruments the City intends to use for outfall sampling associated with the 2016 MS4 Permit parameters. Instrument detection range, applicable SDS No., analytical method, and max holding time are also provided. Preservation is not required if samples are analyzed immediately. Analytical procedures and users' manuals for field test kits and field instrumentation are provided in **Appendix F**.

Table 6-4 Field Sampling Parameters and Analysis Methods

Analyte or Parameter	Field Instrumentation/Test Kit	Detection Range	SDS No.	EPA or Approved Method No.[1]	Max Holding Time[2]
Ammonia	Hach™ DR/890 Colorimeter • Ammonia Cyanurate Reagent Powder Pillows, 10 mL • Ammonia Salicylate Reagent Powder Pillows, 10 mL	0-1 mg/L	M00127 M00128	**EPA:** 350.1	28 days
	CHEMetrics K-1510	0-10 mg/L	R1501 VC1510SS		
Surfactants (Detergents)	CHEMetrics™ K-9400	0-3 mg/L	R9402 R1001		48 hours
Chlorine (Total)	Hach™ DR/890 Colorimeter • DPD Total Chlorine Reagent Powder Pillows, 10 mL	0.02 to 2.00 mg/L Cl_2	M00110		Analyze within 15 minutes
	Hach™ DR300	0.02 – 2.00 mg/L	M00109		
Salinity	Aqua TROLL 500 Multiparameter Sonde - OR - Oakton PCTSTestr 50	0 to 350 ppt	NA		28 days
Conductivity		0 to 350,000 µS/cm	NA	**EPA**: 120.1	28 days
Temperature		-5 to 50°C (23 to 122°F)	NA	**SM**: 2550	Analyze within 15 minutes
pH		0-14	NA	**EPA**: 150.2	Analyze within 15 minutes
Dissolved Oxygen	Hach™ DR/890 Colorimeter • Dissolved Oxygen AccuVac Ampules, High Range	0-15 mg/L	M00537	**EPA**: 360.1; 360.2	Analyze within 15 minutes

[1]EPA or Approved Method No. obtained from Appendix G of the MA Small MS4 Permit
[2]Max Holding Time obtained from 40 CFR Part 136

Testing for indicator bacteria and pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136[2]. Samples must also be stored and preserved in accordance with procedures found in 40 CFR § 136. Table 6-5 lists analytical methods, hold times, preservation requirements, and recommended sample sizes.

Table 6-5 Analytical Methods, Hold Times, and Preservatives for Laboratory Analysis

Analyte or Parameter	EPA or Approved Method No.[1]	Max. Hold Time[2]	Preservation[2]	Sample Size[3]
Ammonia[4]	**EPA**: 350.1	28 days	Cool ≤6°C, H_2SO_4 to pH <2	(1) 500 mL container
Surfactants[4]	**SM**: 5540-C	48 hours	Cool ≤6°C	(1) 500 mL container
E. coli	**EPA**: 1103.1; 1603 **Other**: Colilert®, Colilert-18®, mColiBlue-24®	8 hours	Cool ≤10°C, 0.008% $Na_2S_2O_3$	(2) 100 mL sterile cup container
Enterococcus	**EPA:** 1106.1; 1600 **Other:** Enterolert® 12 22.	8 hours	Cool, <10 °C, 0.008% $Na_2S_2O_3$	(2) 100 mL sterile cup container
BOD_5	**SM**: 5210	48 hours	Cool ≤6 °C	(1) liter plastic container to cover both tests
Total Suspended Solids	**EPA**: 160.2	7 days	Cool ≤6 °C	
Total Phosphorus	**EPA**: 365.1; 365.2; 365.3 **SM**: 4500-P-E	28 days	Cool ≤6 °C, H_2SO_4 to pH <2	(1) 500 mL container
Oil and Grease	**EPA**: 1664	28 days	Cool to ≤6 °C, HCl or H_2SO_4 to pH <2	(1) 1 liter amber glass
Total Copper	**EPA**: 200.7, 200.8, 200.9	6 months	HNO_3 to pH <2	(1) 500 mL plastic
Total Lead	**EPA**: 200.7, 200.8, 200.9	6 months	HNO_3 to pH <2	(1) 500 mL plastic
Polycyclic Aromatic Hydrocarbons[5]	**EPA**: 610; 1625	14 days	Cool ≤6 °C, 0.008% $Na_2S_2O_3$, HCl to pH 2	(1) 1 liter amber glass
Chloride	**EPA:** 300	28 days	None required	10 mL plastic or glass

SM = Standard Methods

[1]EPA or Approved Method No. obtained from Appendix G of the MA Small MS4 Permit, except for Surfactants obtained from 40 CFR Part 136

[2]Max Holding Time and Preservation obtained from 40 CFR Part 136

[3]Sample size obtained from New England Testing Laboratory

[4]Ammonia and Surfactants can be analyzed in the field. Samples are sent to the lab to confirm field results if desired (not required to meet 40 CFR Part 136).

[5]The City currently does not have any outfalls discharging to the Miller's River and therefore do not require analysis for PAHs

Water body segments applicable to the City also contain several pollutants of concern which have monitoring requirements that are undefined and require contacting MassDEP. Those pollutants of

[2] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

concern are listed in Table 6-6. MassDEP was contacted about these pollutants in March 2019 at which time MassDEP did not have any guidance available.

Table 6-6 Pollutants of Concern with Undefined Monitoring Requirements

Analyte or Parameter	Water Body Segments	Notes
Foam/Flocs/Scum/Oil Slicks	MA71-20, MA71-21, MA71-22, MA72-31	Contact MassDEP for monitoring requirements
Fishes Bioassessments	MA72-36	
Combined Biota/Habitat Bioassessments	MA72-38	
Habitat Assessment (Streams)	MA72-31	
Sediment Bioassays – Acute Toxicity Freshwater	MA72-36	
Sediment Bioassays – Chronic Toxicity Freshwater	MA71-20	
Other (Unspecified Metals in sediment)	MA72-36, MA72-31	

There are also several pollutants of concern with no monitoring requirements. Those pollutants of concern are DDT, PCB in Fish Tissue, Polychlorinated biphenyls, Taste and Odor, Water Temperature, Debris/Floatables/Trash, Fish-Passage Barrier, Non-Native Aquatic Plants (water chestnut), Fish/Shellfish/Zooplankton, and other flow regime alterations.

6.2.4 Safety

In some cases, sampling may take place within a roadway or risky environment. It is recommended to request police detail when working within major roadways and be compliant with Part 6 of the Manual on Uniform Traffic Control Devices (MUTCD) standards to implement proper traffic control, including traffic cones and signage as needed. Wear proper PPE including high-visibility safety vests, safety glasses, boots, hard hats and gloves at a minimum. When it is necessary to enter any manhole, City employees must follow DPW's Confined Space Entry Program (attached as **Appendix G**) and contractors working at City facilities will be covered by the contractor procedures of this program and will be expected to follow all requirements.

6.3 INTERPRETING OUTFALL SAMPLING RESULTS

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. Table 6-7 shows values identified by the U.S. EPA and the Center for Watershed Protection as typical threshold screening values for select parameters. These represent the typical threshold concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 6-7 Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria[3]: *E.coli*	The geometric mean of all samples collected within any 90-day or smaller interval shall not exceed 126 colony-forming units (cfu) per 100 mL No more than 10% of all such samples shall exceed 410 cfu/100mL (314CMR04)
Pollutants of Concern:	Greater than relevant water quality criteria of receiving water, as follows:
Total Phosphorus[4]	MassDEP Guideline: For the 2024 reporting cycle, the summer seasonal (May through September) average (n>3 samples) of the total phosphorus concentration data will be screened against the 1986 EPA recommended "Gold Book" concentrations for rivers (0.1 mg/l flowing waters, 0.05 mg/l for rivers entering a lake/reservoir).
Dissolved Oxygen	≥6.0 mg/l in cold water fisheries and ≥5.0 mg/L in warm water fisheries. Where natural background conditions are lower, DO shall not be less than natural background conditions. Natural seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained. (314CMR04; Class B)
Enterococcus	i. concentrations shall not exceed 35 cfu per 100 mL, calculated as the geometric mean of all samples collected within any 90-day or smaller interval; and ii. no more than 10% of all such samples shall exceed 130 cfu per 100 mL (the statistical threshold value). (314CMR04)
pH	6.5 – 8.3 standard units and not more than 0.5 units outside of the natural background range. There shall be no change from natural background conditions that would impair any use assigned to this Class. (314CMR04; Class B)
TSS	These waters shall be free from floating, suspended and settleable solids in concentrations and combinations that would impair any use assigned to this Class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom. (314CMR04; Class B)
Oil and Grease	These waters shall be free from oil, grease and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the water or an oily or other undesirable taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life. (314CMR04; Class B)

6.4 FOLLOW-UP RANKING OF OUTFALLS AND INTERCONNECTIONS

The City will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather

[3] Massachusetts Water Quality Standards: https://www.mass.gov/doc/314-cmr-400/download
[4] Massachusetts Consolidated Assessment and Listing Methodology (CALM) Guidance Manual for the 2024 Reporting Cycle: https://www.mass.gov/doc/2024-consolidated-assessment-and-listing-methodology-guidance/download

screening information becomes available but will be completed within three (3) years of the effective date of the permit (July 1, 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4, or where sampling results indicate sewer input are highly likely to contain illicit discharges from sanitary sources. Such outfalls/interconnections will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from dry weather screening.

7.0 CATCHMENT INVESTIGATIONS

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges.

Catchments are investigated in order of priority, with catchments draining to Problem Outfalls investigated first, followed by High Priority and then Low Priority Outfalls. Within each category the catchments are investigated in the order they are ranked. Work can be ongoing in multiple catchments simultaneously to expedite the process. Table 7-1 provides a schedule for completion of catchment investigations.

Table 7-1 IDDE Schedule for Completion of Catchment Investigations

Parameter	Start	Complete
Problem Catchments	No later than July 1, 2020 (2 years from permit effective date)	By July 1, 2025 (within 7 years of permit effective date)
Catchments with sewer input identified at outfall[1]	No permit requirement	By July 1, 2025 (within 7 years of permit effective date)
All Catchments	No permit requirement	By July 1, 2028 (within 10 years of permit effective date)

[1]Likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage;
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 SYSTEM VULNERABILITY FACTORS

The City will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the storm drainage network
- Plans related to the construction of the sewer drainage network
- Prior work on storm drains or sewer lines
- Complaint records related to SSOs

Based on the review of this information, the presence of any of the following **System Vulnerability Factors (SVFs)** will be identified for each catchment:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- Common or twin-invert manholes serving storm and sanitary sewer alignments
- Common trench construction serving both storm and sanitary sewer alignments
- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
- Areas formerly served by combined sewer systems
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer System Evaluation Surveys, or other infrastructure investigations
- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
- Any sanitary sewer and storm drain infrastructure more than 40 years old.

An SVF inventory will be documented for each catchment, retained as part of this IDDE Plan in **Appendix H**, and included in the annual report. The majority of MS4 catchments were formerly served by combined sewers, therefore they have at least one SVF.

7.2 DRY WEATHER MANHOLE INSPECTIONS

The City will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes and sump manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

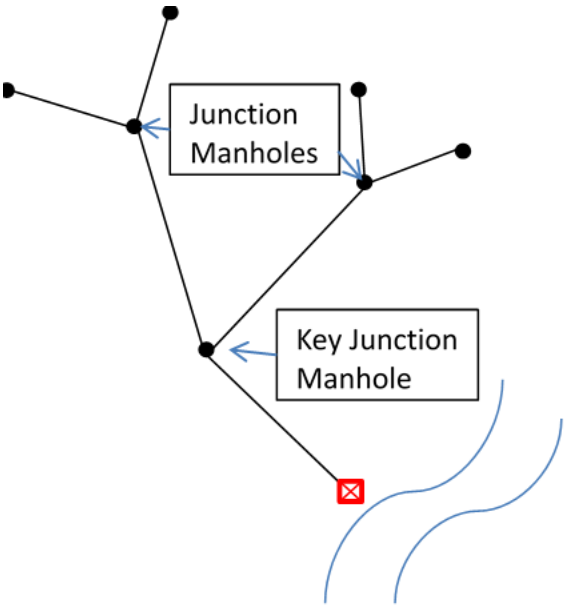
The DPW will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program are defined by the 2016 MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.
- **Common Manholes** have connections to both the sewer and drain system and therefore provide a potential for cross-contamination.

Figure 7-1 IDDE Investigation Procedure Framework



The City estimates there are 418 Mainline Sump Manholes located in separated drainage catchments. Sump manholes have a significant difference in elevation between the bottom of the structure to the bottom of the outlet pipe, which could allow evidence of illicit discharges to collect in the sump and not flow to downstream manholes.

In preparation for field inspections, all key junction manholes and mainline sump manholes will be identified, as well as potential connections to other catchments such as weirs or overflows. For all catchments identified for investigation during dry weather, field crews will systematically inspect all key junction manholes and mainline sump manholes for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

7.2.1 Public Notification

Prior to field investigation of manholes and isolation of illicit discharges, the public will be notified of the investigation. Flyers and door hangers can be used to notify property owners of the ongoing investigation and of the potential need for access to their property in order to investigate illicit discharge sources.

7.2.2 Storm Drain Cleaning

Review cleaning records to determine the last time storm drains in the catchment were cleaned and identify possible candidates for cleaning. As a general rule, if it has been more than five (5) years since a drain has been cleaned, it should be flagged for cleaning prior to investigations. However, it should be noted that large diameter pipes may not require cleaning as frequently. This information may be obtained from Cartegraph. In addition, any known blockages should be removed, and known problem areas should be cleaned prior to the inspection of manholes. All sump manholes should also be cleaned/emptied prior to investigation. If cleaning is not completed prior to the investigation, there will be a note made on the manhole inspection form if cleaning is needed.

7.2.3 Manhole Inspection Methodology

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively down from the upper parts of the catchment toward the outfall ("top-down"); or
- By working progressively up from the outfall and inspecting key junction manholes along the way ("bottom-up").

The decision to move up or down the system depends on the nature of the drainage system (e.g., size, receiving water influence) and availability of information on the catchment and drainage system. Starting upstream and working progressively down is the preferred option, as it is typically more efficient. Cambridge is well-suited for this approach because the City has complete and accurate GIS mapping of the MS4 system already. As discussed in Section 6.2.3, most outfalls discharging to the Charles River and Alewife Brook are at least partially submerged. This is another reason that a "top-down" approach is more suitable for Cambridge.

As manhole inspections progress toward the receiving water, there will inevitably be a point where submerged manholes are encountered. When manholes are observed to be partially or completely submerged, samples should not be collected. The City may choose to complete the investigation of submerged pipes via building inspections and dye testing, or by bypass pumping the storm drain so it can be inspected. If dye testing is the selected method, it may not be possible to observe dye in a submerged storm drain. In this case, positive identification of dye in the sanitary sewer would be considered proof of a legal connection to the sewer.

During Permit Year 7, the City began developing and implementing a Standard Operating Procedure (SOP) to plug and pump submerged storm drains as an alternative to dye testing. The goal was to develop an efficient and cost-effective protocol to complete IDDE investigations where there are

submerged drains, particularly for areas that would have required a significant dye test effort. The plug-and-pump approach involves plugging the storm drain at the downstream end and pumping out standing water and/or backwater behind the plug. The plug is kept in place for a period of several days and monitored daily, so that dry weather investigations can proceed. The protocol was further developed and tested in catchment D40 during permit year 8 with limited success. Several stretches of drain were successfully cleared, but due to challenges with weather, equipment issues, blockage in the drain, significant drain cleaning needed, and high I/I to the drain system, the effort was significant and several drain segments could not be cleared, therefore some dye tests were still required.

There are some exceptions where it is efficient to start inspections at the outfall and work progressively upstream. This approach is most appropriate for small catchment areas free of influence from receiving waters. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

Manhole investigation begins with key junction manholes and mainline sump manholes and continues with junction manholes and other manholes as needed to isolate illicit discharges. Manhole inspections will proceed as follows (also as depicted in flowchart provided in **Appendix I):**

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections during dry weather. Dry weather is defined as less than 0.1 inches of rain in the preceding 24 hours. When possible, 48 to 72 hours of dry weather preceding the investigation is preferred. A sample field inspection form is provided in **Appendix E**.

   Visual evidence may include toilet paper, sanitary products, sewage, soap, food, or other indications of anything other than stormwater. Olfactory evidence may include sewage, soap, laundry, bleach or other odors not typical of stormwater.

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with procedures outlined in **Section 6**.

   Additional indicator sampling may assist in determining potential sources. At the City's discretion, samples may be collected and sent to a lab for analysis of E. coli[5]. If a positive result is obtained from the field kit for ammonia, a sample may be collected and sent to a lab for analysis of ammonia to confirm the field kit[6]. Similarly, if a positive result is obtained from the field kit for

[5] The 2016 Permit does not require E. coli sampling at manholes, however, this information can be very useful in identifying storm drains with illicit discharge potential.
[6] The 2016 Permit does not require ammonia to be analyzed by a lab, however, this is the City's current practice and provides more reliable and accurate data than the field test kits.

surfactants, a sample may be collected and sent to a lab for analysis of surfactants to confirm the field kit[7].

3. If no flow is observed, the inlets or outlet to the manhole may be partially blocked using sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) for 48 hours, if dry weather is predicted for the next 48 hours. Following 48 hours of dry weather the manholes are re-inspected, and any flow that was captured behind the sand bags is tested in accordance with the protocols outlined in Step 2. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. The inlets of the manhole may be blocked in the case of a manhole with multiple stormwater pipes entering (junction manhole) to isolate the source of the flow, and the outlet may be blocked if there is a single pipe entering.

   To install sandbags, swing the sandbag into place using rope and tie the rope to the top rung.

4. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.

5. Subsequent manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.

6. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 WET WEATHER OUTFALL SAMPLING

Where a minimum of one (1) SVF is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The DPW will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening, and the same form will be used to record data.

[7] The 2016 Permit does not require surfactants to be analyzed by a lab, however, this is the City's current practice and provides more reliable and accurate data than the field test kits.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. The permit does not require a minimum rainfall event prior to wet weather screening. The permit also does not require capturing “first flush”.

3. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

7.4 SOURCE ISOLATION AND CONFIRMATION

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Dye Testing
- CCTV/Video Inspections

These methods are described in the sections below. Instructions and Standard Operating Procedures (SOPs) for these and other IDDE methods are provided in **Appendix I**.

Public notification is an important aspect of a detailed source investigation program. Prior to dye testing, the DPW will notify property owners in the affected area. Notification will include flyers, door hangers, and certified mailings for single family homes, businesses, and building lobbies for multi-family dwellings.

During Permit Year 2 the City began mailing dye test letters via certified mail to buildings that they were unable to access by cold-knocking and leaving door hangers. In most cases the certified dye test letters have been successful and resulted in the City gaining access to perform the dye test. However, some owners were still not responsive. During Permit Year 6, the City began mailing a “First Violation Letter” via certified mail to buildings that did not respond to the certified dye test letter.

7.4.1 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks, and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. It may be beneficial to inform residents and business owners of properties that will need to be accessed for a dye test, prior to conducting the dye test. The intention is to increase the likelihood of gaining access to buildings that need to be dye tested.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). The team starts by inspecting the discharge piping at the lowest building level to determine the location and number of sanitary and storm drain discharge points. Based on this inspection, a fixture or fixtures are selected for dye testing. When possible, the fixture selected should be at the lowest level of the building with plumbing fixtures. If discharge piping is visible and the team confirms there is a single sanitary discharge, one fixture will be tested. When there are multiple discharge points observed, or it is not possible to confirm the configuration of discharge piping, multiple fixtures may be tested. In this situation it is recommended to select fixtures on different sides of the building.

Once the fixtures are selected, one person is inside the building, while the others are stationed at the appropriate storm drain and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been added, and the outside crew watches for the dye in the storm drain and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

Green dye typically shows up best in the sewer and storm drain. However, if multiple fixtures in the same building are being tested or multiple buildings along the same stretch of pipe, it may be necessary to use different color dyes to differentiate. Red is typically the second-best color choice, and blue the next. Another option is to space out the dye tests to allow time for the dye to clear from the sewer/drain in between tests.

Dye is available in liquid or tablet form. Liquid is commonly used and works faster but presents a higher risk for spills and can stain clothes and carpets. It is important to handle with care.

In areas with very flat drains, it can take longer for the dye to make its way to a downstream manhole. There are a few ways to address this issue; by inspecting the storm drain with a video camera during dye testing, or by using a nearby hydrant to introduce flow to the storm drain and push dye downstream. The use of a hydrant will require coordination with the Water Department.

7.4.2 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques. CCTV is recommended in cases where dye testing is inconclusive (dye not found, or dye found in sewer and storm drain), and in cases where dye testing did not identify a source. As noted above, it can also be combined with dye testing.

7.5 ILLICIT DISCHARGE REMOVAL

When the specific source of an illicit discharge is identified, the City will exercise its authority as necessary to require its removal within (60) sixty days. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery

- Date of elimination, mitigation or enforcement action, OR planned corrective measures, and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed.

The volume of flow can be estimated using an assumed volume of sewage from a typical house or can be based on water use. If only a portion of the building is illicitly connected, the volume of sewage must be proportionally reduced.

7.5.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless SVFs have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

7.6 ONGOING SCREENING

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to SVFs, and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8.0 TRAINING

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix J**. The frequency and type of training will be included in the annual report.

9.0 PROGRESS REPORTING

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

10.0 REFERENCES

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APPENDIX A

Legal Authority

Wastewater and Stormwater Drainage System Ordinance

Wastewater and Stormwater Drainage Use Regulations

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Chapter 13.16 - WASTEWATER AND STORMWATER DRAINAGE SYSTEM

Sections:

13.16.010 - Definitions.

Unless the context specifically indicates otherwise, the meaning of terms used in this chapter shall be as follows:

1. "Combined Sewer" shall mean a sewer designed to receive both wastewater and stormwater.
2. "Commissioner" means the Commissioner of Public Works of the City of Cambridge, or his or her designee.
3. "Land Disturbance" shall mean any action that causes a change in the position, location, or arrangement of soil, sand rock, gravel of similar earth material.
4. "Land Disturbance Activity" shall mean any activity that causes a change in the position or location of soil, sand, rock, gravel, or similar earth material.
5. "Owner" shall mean a person who along or jointly or severally with others has the legal title to any premises or has care, charge or control of any premises as agent, executor, administrator, trustee, lessee or guardian of the estate of the holder of legal title.
6. "Person" shall mean any agency of the federal government, any agency or political subdivision of the Commonwealth, any State, public or private corporation or authority, individual, trust, firm, joint stock company, partnership, association, or other entity, or any group thereof, and any officer, employee, or agent of such person, and any group of persons.
7. "Private Combined Sewer" shall mean a combined sewer which is not owned by the City, DCR or the MWRA. Private combined sewers include, but are not limited to, building Drains (wastewater), building combined sewer laterals and manholes located on private property and not located within an easement held by the City or other public agencies. The owner of the private combined sewer is also responsible for the connection from a private sewer to the public wastewater system.
8. "Private Sewer" shall mean a sewer that is not owned by the City, DCR or the MWRA. Private sewers include, but are not limited to building Drains (wastewater), building sewer laterals and manholes located on private property and not located within an easement held by the City or toher public agencies. The owner of the private sewer is also responsible for the connection from a private sewer to the public wastewater system.
9. "Private Stormwater Drain" shall mean a stormwater Drain that is not owned by the City or the DCR. Private Stormwater Drains include, but are not limited to, building Drains (stormwater), building stormwater Drain laterals, catch basins and manholes located on private property and not located within an easement held by the City and other public agencies. The owner of the private stormwater Drain is also responsible for the connection from a private stormwater Drain to the public stormwater system.
10. "Public Combined Sewer" shall mean a combined sewer that is owned by the City, DCR or the MWRA.
11. "Public Sewer" means a sewer which is owned by the City, DCR or the MWRA or any of their successors.
12. "Public Stormwater Drain" shall mean a stormwater Drain that is owned by the City or the DCR.
13. "Sanitary sewer" means a sewer designed to carry sewage.
14. "Sewage" means the spent water of a community, which may be a combination of liquid and water-carried wastes from residences, commercial buildings, institutions and industrial facilities,

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together with leachate and construction site dewatering, and exclusive of groundwater, surface water, and/or stormwater.

15. "Sewer" means a pipe or conduit for carrying sewage.

16. Shall and May. Shall is mandatory; may is permissive.

17. "Stormwater" shall mean any water resulting from rainfall or other precipitation that runs off surfaces during or after a storm.

18. "Stormwater Drain" means a pipe or conduit that carries surface water, stormwater and groundwater or runoff and is exclusive of sewage.

19. "Stormwater Drainage System" means pipes, conduits, pumping stations and appurtenances, including tidegates, catch basins, and manholes used in the collection and transport of stormwater, groundwater and runoff.

20. "Wastewater" shall mean Sewage, together with any Groundwater, Stormwater and surface water that may be present.

21. "Wastewater System" shall mean totality of the devices, equipment or works used in transportation, pumping, storage, treatment, recycling or reclamation of Wastewater or in the disposal of the effluent.

(Ord. 1313, Added, 01/28/2008)

13.16.020 - Wastewater System and Stormwater Drainage System connection - General regulations.

A. The Commissioner is hereby authorized to regulate Combined Sewers, Land Disturbance Activity, Private Combined Sewers, Private Sewers, Private Stormwater Drains, Public Combined Sewers, Public Sewers, and Public Stormwater Drains and any other equipment or installations of any description now or in the future connected to the City's Wastewater System or Stormwater Drainage System. The Commissioner shall have authority to promulgate regulations and guidance documents regulating all activities in any way related to the uncovering, excavating over, blocking access to, making any connection with or opening into, altering, or disturbing, or in any way directly or indirectly using the city's Wastewater System or Stormwater Drainage System, and shall establish permit requirements for all such activities and take necessary and appropriate enforcement action to prohibit or remedy any such unpermitted activity.

B. No unauthorized Person or Owner shall uncover, excavate over, block access to, make any connection with or opening into, alter or disturb, or in any way directly or indirectly use the City's Wastewater system or Stormwater Drainage System or appurtenance thereof without first obtaining a written permit from the Commissioner. Any person proposing a new discharge into the system or in any way changing the volume or character or any effluent that is to be or is being discharged into the City's Wastewater System or Stormwater Drainage System shall be required to notify the Commissioner at least forty-five days prior to the proposed change or connection, and shall be further required to obtain all required permits and to comply with all regulations and guidance documents promulgated by the Commissioner pursuant to the authority granted to the Commissioner by this ordinance and by any and all applicable federal, state and local laws, regulations and rules and shall be responsible for all fees and charges established by the Commissioner in said regulations.

C. All costs and expense incident to the installation and connection to the City's Wastewater System or Stormwater Drainage System and any costs of maintenance thereof shall be borne by the owner. The owner shall indemnify the City from any loss or damage that may directly or indirectly be occasioned by the installation of any connection to the City's Wastewater System or Stormwater Drainage System. Notwithstanding the foregoing, the city Manager may provide for connection to the mains of the City's Wastewater System and Stormwater Drainage System in the public way at the expense of the City when the need for a new connection stems from the City's commitments to

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sewer and storm drain separation and correction of improperly connected building sewer and storm drain lines as required by the United State Environmental Protection Agency, the Massachusetts Department of Environmental Protection, the Massachusetts Water Resources Authority, and the City of Cambridge DPW. The City Manager may limit the City's assumption of costs for correction or improperly connected building sewer or storm drain lines where the City Manager determines that the improper connection was made negligently, knowingly, or intentionally by the owner or form owner of the property, their agents, or other acting on their behalf.

(Ord, 1313, Added, 01/28/2008; Ord. 1313, Added, 01/28/2008; 1203, Amended, 06/01/1998)

13.16.030 - Wastewater System and Stormwater Drainage System — City Engineer's duties.

The City Engineer shall make and file in his or her office, accurate plans of the Wastewater System and the Stormwater Drainage System, showing all entrances thereto when made as provided in the regulations and guidance documents promulgated by the Commissioner pursuant to the authority granted to the Commissioner by this ordinance and by any and all applicable federal, state and local laws, regulations and rules.

(Ord. 1313, Added, 01/28/2008)

13.16.040 - Interference and obstruction during construction.

Whenever any street is opened for the laying of pipes for water, gas or other purposes, or for any work of construction, such laying of pipes and work connected therewith, or such work of construction shall be so executed as not to obstruct, in any way, the course, capacity or construction of any part of the City's Wastewater System and Stormwater Drainage system, and whenever pipes for any purpose, or any work of construction, are found to exist at such a depth or in such location as to interfere with any existing part of the city's Wastewater system or Stormwater Drainage System, the person maintaining the same, shall, upon notice thereof, at once remove, change or alter such pipe or pipes or other works, in such a manner as the City Engineer may direct.If such person neglects to comply immediately with the terms of such notification the City Engineer may make such removal, change or alternation, and the cost thereof shall be paid by such person; provided, that whenever any sewer is to be constructed, or any water pipe to be laid, in any street or way, the city Engineer and Chief Superintendent of Water works shall consult with each other in regard to the location of any existing pipes.

(Prior code 17—49)

(Ord, 1313, Added, 01/28/2008)

13.16.050 - Discharges—Commissioner's responsibilities.

A. The Commissioner shall promulgate regulations and guidance documents to control the use of the City's Wastewater System and Stormwater Drainage system throughout the city so as to require that no person shall, without prior authorization from the commissioner, uncover, excavate over, block access to, make any connection with or opening into, alter, or disturb, or in any way directly or indirectly use the City's Wastewater System or Stormwater drainage system, to prohibit any person from maliciously, willfully or negligently breaking, damaging, destroying, uncovering, defacing or tampering with any structure, appurtenance, or equipment which is part of the city's Wastewater System or Stormwater Drainage System.Said regulations promulgated by the Commissioner shall require that all activities by users of the City's Wastewater System and Stormwater Drainage System are accomplished in a manner that complies with all federal, state and local laws, regulations and rules n effect and as amended.If any waters or wastes are discharged, or are proposed to be discharged to the City's Wastewater System or Stormwater drainage System, which waters contain

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substances or possess characteristics prohibited in the Commissioner's regulations and guidance documents or in any and all applicable federal, state or local law, regulation or rule, the Commissioner may:

1. Reject the wastes;
2. Require pretreatment to an acceptable condition for discharge to the City's Wastewater System or Stormwater Drainage System;
3. Require control over the quantities and rates of discharge;
4. Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges, or
5. Take any other enforcement action or response provided in the Commissioner's regulations and guidance documents or pursue any other remedy provided by any applicable federal, state or local law, regulation or rule.

(Ord. 1313, Added, 01/28/2008)

13.16.060 - Inspectors—Powers and authority.

A. The Commissioner or his or her designees bearing proper credentials and identification shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling and testing in accordance with the provisions of this ordinance and the regulations and guidance documents promulgated by the Commissioner pursuant to the authority granted to the Commissioner by this ordinance and any and all applicable laws, regulations and rules.

B. The Commissioner or his or her designees bearing proper credentials and identification shall be permitted to enter all private properties through which the City holds a duly negotiated easement for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance of any portion of the sewage or stormwater works lying within such easement.All entry and subsequent work, if any, on such easement, shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved.

(Ord. 1007 (part), 1984: prior code § 17-58)

(Ord. 1313, Added, 01/28/2008)

13.16.070 - Assessments — Wastewater System prerequisite.

No owner of land or buildings or any portion of land or buildings shall be assessed for a Wastewater System benefit until said land or buildings can be drained into the Wastewater System and no such land or buildings or portion of such land or buildings shall be assessed more than once for the same sewer benefit.

(Prior code § 17-50)

(Ord. 1313, Added, 01/28/2008)

13.16.080 - Annual Wastewater System use charge.

There is established an annual charge for the use of the City's Wastewater System by any land or buildings in the City having one or more connection discharging into said Wastewater System.

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A. The City Manager shall annually recommend to the City Council, a just and equitable Wastewater System service charge based on water supplied to, delivered to, and received by any land or buildings that drain to the Wastewater system, determined by metered water consumption an/or other applicable standards for computation of water supplied, delivered or received by said land or buildings.The charge shall take into account all appropriate Wastewater System related estimated revenues and available surpluses, and shall produce sufficient revenue to equal or exceed the annual appropriations proposed for Wastewater System operation, maintenance and debt service.the city Council shall adopt annually the Wastewater system service charge.

B. The quantity of water supplied by the City through a water meter in good working order shall be determined by the reading of such meter.The owner of land or buildings or any portion of land or buildings that drain to the Wastewater System receiving or using water supplied to, delivered to, or received by any source other than the City shall so notify the Commissioner in accordance with regulation promulgated by the Commissioner pursuant to the authority granted to the Commissioner by this ordinance any any and all applicable federal, state and local laws, regulations and rules.Where water is not supplied by the City, but derived or received by said land or buildings from another source, and/or water is used by said land or buildings in such a manner as to enter the Wastewater System of the City, such water shall be measured by one or more water meters in good working order installed and maintained on the land or buildings by the owner, at the expense of the owner, subject to inspection and approval by the Commissioner. The quantity of water so derived or received, or the quantity of water so used, or both, shall be determined by the readings of such meter or meters.Alternatively, at the discretion of the Commissioner, the quantity of all other water delivered to or received by land or buildings shall be established by the Commissioner by any reasonable and equitable method apt in the circumstances of the particular case to determine the quantity of water discharged by said land or buildings into the Wastewater System of the City.

C. An owner of land or buildings may apply to the Commissioner for an abatement of said Wastewater System charge if water so supplied, derived or received is used on said land or in said buildings in such a manner as not to enter the Wastewater System of the City. Determination of the charge established by this Section shall be adjusted to reflect the quantity so used deducted from the aggregate amount of water so supplied. derived or received during such period.

D. In no case shall the minimum annual charge for Wastewater System use under the provisions of this chapter be less than ten dollars.

E. The charges established by this Section shall be due and payable by the owner of record at such time or times and in such installments if any, as the Commissioner from time to time determines.The Commissioner shall in his or her order of assessment designate as the owner of a parcel assessed, the person who was liable to assessment therefor on the preceding January 1st.

F. A monthly interest charge of one and on-half percent shall be assessed on the balance of any sewer service use charge remaining unpaid after thirty days from the date of billing. Nonpayment upon such date shall furthermore be deemed to be delinquent and thereafter such delinquency shall constitute a lien upon the real estate for which such service is supplied.The city Treasurer-Collector is authorized and directed to file sworn statements showing such delinquencies in the office of the Recorder of Deeds of Middlesex County, and the filing of such statements shall be deemed notice of the lien of such charges for such services.

(Ord. 1007 (part), 1984: prior code § 17-62)

(Ord. 1313, Added, 01/28/2998)

13.16.090 - Property destruction prohibited.

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In addition to all penalties and remedies available to the Commissioner pursuant to the regulations and guidance documents promulgated pursuant to the authority of this ordinance and provided in any other applicable federal, state or local law, regulation or rule, no unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a part of the City's Wastewater System or Stormwater Drainage System.Any person violating this provision shall be subject to immediate arrest under charge of disorderly conduct.

(Ord. 1007 (part), 1984: prior code § 17-60)

(Ord. 1313, Added, 01/28/2008)

13.16.100 - Violation — Penalty

A. Any person found to be violating any of the provisions of the regulations and guidance documents promulgated by the Commissioner pursuant to the authority granted to the Commissioner by this ordinance and by any and all applicable federal, state or local laws, regulations or rules, shall be guilty of a misdemeanor, and on conviction thereof, shall be fined in the amount not exceeding $5,000.00 dollars for each violation. Each day in which any such violation continues shall be deemed a separate offense.

B. Any person violating any of the provisions of the regulations and guidance documents promulgated by the Commissioner pursuant to the authority granted to the Commissioner by this ordinance and by any and all other applicable federal, state or local laws, rules or regulations shall become liable to the City for any expense, loss or damage occasioned the City by reason of such violation.

(Ord. 1007 (part), 1984: prior code § 17-61)

(Ord. 1313, Added, 01/28/2008)

The City of Cambridge
Department of Public Works

The City of Cambridge Commissioner of Public Works ("the Commissioner") hereby adopts these Wastewater and Stormwater Drainage Use Regulations pursuant to Cambridge Municipal Code Chapter 13.16 Wastewater and Stormwater Drainage System.

WASTEWATER AND STORMWATER DRAINAGE USE REGULATIONS

ARTICLE I
General Provisions and Definitions

Section 1 - Reference to Regulations. These Regulations may be referred to as the City of Cambridge Wastewater and Stormwater Drainage Use Regulations.

Section 2 - Authority. Under the authority of Chapter 436 (Section 6) of the 1977 Acts and Resolves of Massachusetts, M.G.L. c. 83, §§ 14-24, the general police powers of the City of Cambridge, the provisions of Cambridge Municipal Code Chapter 13.16 §13.16.020 and pursuant to the regulations of the federal Clean Water Act, 40 CFR 122.34, the City of Cambridge Commissioner of Public Works ("Commissioner") has established the following Regulations governing the use of public and private Wastewater and Stormwater Drains in the City.

Section 3 - Purpose. These Regulations are intended to protect the public health, safety and welfare and the environment and to ensure proper and safe operation of the City's Sanitary Sewers, Combined Sewers and Stormwater Drains by regulating the direct and indirect discharge of Waste, stormwater and pollutants to the City's Wastewater and Stormwater Drainage systems. These Regulations are also intended to prohibit and remove illicit connections and unauthorized discharges to the City's Stormwater Drainage system. This includes the legal authority to carry out all inspection, surveillance and monitoring procedures necessary to comply with this Regulation.

Section 4 - Severability. The provisions of these Regulations are severable. If any provision of these Regulations or any specific application to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of these Regulations which can be given effect in the absence of the invalid provision or application.

Section 5 - Applicable Regulations. Every user of the City's Wastewater or Stormwater Drainage systems shall be subject to these Regulations, as they apply, and to any charges, rates, fees, and assessments which are or may be established by the City. Every user of the City's Wastewater or Stormwater Drainage systems shall also be subject to applicable federal, state, and local regulations. In instances where various regulations contain different requirements, the most stringent requirements shall apply.

Section 6 - Right to Amend Regulations. The City reserves the right to amend these Regulations in any manner and to establish additional limitations or requirements as are deemed necessary or appropriate.

Section 7 – Federal, State, and Local Regulations. No provision of these Regulations shall be deemed to contravene or render ineffective any valid federal, state or local regulation.

Section 8 – DPW Approval.

(a) In addition to any permits that may be required by applicable federal, state or local laws or regulations, DPW Approval is required by these Regulations and shall be issued by the DPW approving any work relating to the following Wastewater and Stormwater drain related activities as they apply:

(i) Collection System Access - Excavation Permit (No Trench)

(ii) Termination and Verification (cutting and capping) - Excavation Permit

(iii) Stormwater Discharge - Excavation Permit and/or Stormwater Control Permit

(iv) Wastewater Discharge* - Building Permit and/or Excavation Permit and/or MWRA Sewer Use Discharge Permit

(v) FOG (Fats, Wax, Oils and Grease)* – Building Permit

(vi) Excavation (in public ways) - Excavation Permit and/or Stormwater Control Permit

(vii) Demolition* - Building Permit and/or Excavation Permit and/or Stormwater Control Permit

(viii) Temporary Construction Site Dewatering – Dewatering Permit

(ix) Direct Connection (to municipal Wastewater and/or Stormwater Drainage system) – Excavation Permit

NOTE*: DPW Approval is through sign-off of permits issued through the Inspectional Services Department

[In addition to a DPW Approval, a Sewer Use Discharge Permit, when required by the Massachusetts Water Resources Authority (MWRA), shall be issued jointly with the MWRA and the DPW.]

(b) No discharge or operation, which affects the Wastewater or Stormwater Drainage system, shall be authorized without the appropriate valid DPW Approval for the discharge or operation first being obtained.

(c) The DPW may refuse to issue a DPW Approval for any Discharge which it believes can reasonably be expected to result in significant harm to health, safety, the environment, the City's Wastewater or Stormwater Drainage system, a tributary to the City's Wastewater or Stormwater Drainage system, or may pass through, interfere with, or otherwise be incompatible with the wastewater treatment process or sludge disposal.

(d) The DPW shall enforce, pursuant to Article X of these Regulations and other applicable, federal, state or local laws and regulations, the terms and conditions of a DPW Approval issued under these Regulations.

(e) The DPW may modify n DPW Approval as deemed necessary or appropriate or as required by federal, state or local laws or regulations.

(f) A permittee may request reconsideration of the terms and conditions in an issuance, renewal, or modification of a DPW Approval issued by the DPW, and an applicant may request reconsideration of the denial of a DPW Approval by the DPW.

[With regard to Sewer Use Discharge Permits, which are issued jointly by the DPW and the MWRA, requests for reconsideration shall be subject to the requirements of these Regulations and to the requirements and procedures of the MWRA.]

(g) A DPW Approval shall not be assigned or transferred without prior written approval of the DPW. After approval of a DPW Approval assignment or transfer, the permittee shall provide a copy of the DPW Approval to the assignee or transferee and to the DPW.

(h) These Regulations shall not be construed to require the DPW to permit itself for activities done to carry out the DPW's responsibilities under any federal, state or local laws, regulations or requirements. Requirements specific to permits required by these Regulations can be waived by the authority of the Commissioner of Public Works or his/her designee,

Section 9 – **Definitions -** Terms which are not defined herein shall be interpreted as defined in the most recent edition of *Glossary-Water and Wastewater Control Engineering*, published by the Water Pollution Control Federation (WPCF) [now called the Water Environment Federation (WEF)], Washington, D.C. Throughout these Regulations, shall means mandatory, and may means permissive. The following terms shall have the following meanings:

Aliquot shall mean a divisor or factor of a quantity, constituting a sample.

Backwater valve also referred to as a **back-flow valve, check valve** or **back-flow preventer** shall mean a device installed in a building Drain or a building stormwater Drain to prevent the discharge from the building, or flows originating outside the building, from flowing back into the building.

Bacteria treatment shall mean the introduction into the Wastewater system of microorganisms specifically bred to accelerate the natural decomposition of fats, oils and grease of animal or vegetable origin.

Below grade plumbing fixture shall mean any plumbing fixture located at an elevation below the elevation of the roadway adjacent to the property to which the City's Wastewater or Stormwater Drainage systems serving the fixture shall be considered to be liable to backflow.

Biochemical Oxygen Demand or **BOD** shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedures for five (5) days at (20) degrees centigrade, usually expressed as a concentration (e.g. mg/l).

Best Management Practices or BMP shall mean Stormwater Management techniques that reduce pollution from stormwater runoff.

Blowdown shall mean the minimum discharge of recirculated water from a heating or cooling system for the purpose of preventing the concentration of materials contained in the water from exceeding limits established by best engineering practice.

Building combined sewer lateral shall mean the pipe, which connects a building Drain carrying Waste to a combined sewer or other place of disposal. The building combined sewer lateral begins 10 feet outside the inner face of the building foundation wall and extends to and includes the connection to the City,, MWRA, DCR or private Wastewater systems.

Building Drain shall mean the lowest horizontal piping of a plumbing or Drainage system which extends from inside or outside the walls of a building to a point ending 10 feet (3.048 meters) outside the inner face of the building foundation wall. The building Drain conveying Waste from plumbing fixtures within the building shall discharge to a building sewer lateral or building combined sewer lateral, while the building Drain conveying stormwater and other Drainage shall discharge to a building stormwater Drain lateral.

Building sewer lateral, also referred to as a **house sanitary connection, or sanitary service**, shall mean the pipe which connects to a building Drain conveying Waste from plumbing fixtures within a building to a City sanitary or combined sewer, a private sanitary or combined sewer, an MWRA sewer (where allowed by MWRA), or other place of disposal. The building sewer lateral begins 10 feet outside

the inner face of the building foundation wall and extends to and includes the connection to the City, MWRA, DCR or private wastewater systems.

Building stormwater Drain lateral shall mean the pipe, which connects a building Drain conveying stormwater to a stormwater Drain, combined sewer, or other place of disposal. The building stormwater Drain lateral begins 10 feet outside the inner face of the building foundation wall and extends to and includes the connection to the City's stormwater Drain, combined sewer or private combined sewer or stormwater Drain.

Bypass shall mean an intentional or negligent diversion of a waste stream, by direct or indirect means.

Catch basin shall mean a structure used to collect runoff and divert it to the stormwater or combined collection system.

Chemical Oxygen Demand or **COD** shall mean the oxygen equivalent of the portion of the organic matter that is susceptible to oxidation by a chemical oxidant, expressed in milligrams per liter, as determined by a procedure described in the latest edition of *Standard Methods for the Examination of Water and Wastewater*.

City shall mean the City of Cambridge, Massachusetts.

City Engineer shall mean the City Engineer of the City of Cambridge or his/her designee.

Cleanout shall mean a device or structure designed to provide access to a building combined sewer lateral, building sewer lateral or building stormwater Drain lateral for the purpose of eliminating blockages and removing deposited or accumulated materials.

Collection system shall mean the pipes, conduits, pumping stations, and appurtenances involved in the collection and transport of Waste and stormwater.

Collection System Access shall mean the opening and/or entry of a person or equipment into the City's Wastewater or Stormwater Drainage systems and shall be authorized only pursuant to a validly issued DPW Approval under Article I Section 8(a)(i).

Combined sewer shall mean a sewer designed to receive both Waste and stormwater.

Combined Sewer Overflow (CSO) or **Combined Sewer Outfall** shall mean the portion of a pipe extending from a combined sewer regulator downstream to its outlet. This term is also used to mean the permitted discharge of combined sewage to a receiving water body.

Commissioner shall mean the Commissioner of the Department of Public Works.

Common manhole (CMH) shall mean a structure allowing access to both sanitary or combined sewer, and stormwater Drainage systems typically configured to allow sanitary sewer or combined sewer pipes and stormwater pipes to pass through the same structure where flows are separated by a horizontal plate or vertical wall.

Commonwealth shall mean the Commonwealth of Massachusetts.

Composite sample shall mean a combination of individual samples of Wastewater or stormwater taken at predetermined intervals to represent the integrated composition of the sample source.

Connection shall mean the point where a sewer, stormwater Drain or combined sewer is joined to another sewer or Drain.

Construction Site Dewatering shall mean any water that is directly or indirectly discharged to the City of Cambridge collection system from a construction site.

Conventional Pollutant shall mean as specified under the Clean Water Act, conventional pollutants including solids, coliform bacteria, high biochemical oxygen demand, pH, oil and grease.

Cooling water shall mean the water discharged from any system of condensation, air conditioning, cooling, refrigeration, or other system of heat transfer.

CPHD shall mean the Cambridge Public Health Department.

Cross connection shall mean any actual or potential physical connection or arrangement between a pipe conveying potable water from a public water system and any non-potable water supply, piping arrangement or equipment including, but not limited to, waste pipe, soil pipe, sewer, Drain or other unapproved sources.

Daily Maximum Limit shall mean the highest allowable concentration for any pollutant in a waste stream.

DCR shall mean the Massachusetts Department of Conservation and Recreation [formerly known as the Metropolitan District Commission (MDC)].

Decorative fountain shall mean an indoor or outdoor fountain that is designed and constructed for aesthetic purposes and is not intended for human contact recreation or for providing drinking water.

Demolition Permit shall mean any dismantling, intentional destruction or removal of structures, utilities, public or private right-of-way surfaces, or similar property

DEP shall mean the Massachusetts Department of Environmental Protection.

Dewatering Drainage shall mean groundwater or surface water, which is removed from a site and discharged beyond the limits of the site by means of gravity or pumping.

Direct Connection shall mean the new connection to the municipal Wastewater and Stormwater Drainage systems or modification, reconnection or repair of an existing connection to the municipal Wastewater and Stormwater Drainage systems.

Discharge shall mean flow from a canal, conduit, Sewer, Drain, Outfall, pump, stack, tank or treatment process, or any emission, intentional or unintentional, including but not limited to, flow resulting from spilling, leaking, seeping, pumping, pouring, emitting, emptying, depositing, dumping, releasing, injecting, escaping, leaching or infiltrating whether direct or indirect.

Downspout shall mean a pipe, which conveys Stormwater from the roof of a building into a Stormwater Drain or combined sewer or into or onto the ground. Also called a roof Drain or roof leader.

DPW shall mean the City of Cambridge Department of Public Works.

DPW Approval shall mean Approval by DPW of any Excavation Permit, Dewatering Permit, Stormwater Control Permit, Building Permit (pre-review) and MWRA Sewer Use Discharge Permit for the purposes of Collection System Access, Termination and Verification, Stormwater Discharges, Wastewater Discharges, the discharge of FOG, Excavation, Demolition, Temporary Site Dewatering, and the Direct Connection to the municipal wastewater and stormwater drainage systems or MWRA wastewater system.

Drain shall mean a horizontal pipe that carries Waste, water or waterborne waste in a drainage system or a horizontal stormwater conveyance channel, whether natural or artificially constructed, enclosed or open.

Drainage Facility shall mean any system of artificially constructed Drains, including open channels, whether lined or unlined, and separate stormwater Drains used to convey stormwater, surface water or groundwater. A Drainage facility may also convey effluent discharged pursuant to an National Pollution Discharge Elimination System (NPDES) permit when such use is approved by the DPW.

Dry weather flow shall mean any flow in a stormwater or Wastewater system in dry weather conditions.

Dry well shall mean a pit or underground cavity installed to drain surface water and stormwater Drainage into underground strata.

Dwelling unit shall mean a house, condominium, fraternity, dormitory, apartment, mobile home or trailer, group of rooms or single room occupied or intended for occupancy as a separate living quarter.

Easement shall mean an acquired legal right for the specific use of land owned and maintained by others.

Effluent shall mean Waste or other liquid, irrespective of treatment, flowing out of a treatment facility or part thereof.

Enzyme shall mean a protein that acts as a catalyst to induce chemical changes in other substances, itself remaining apparently unchanged in the process.

EPA shall mean the United States Environmental Protection Agency.

EPA Site Dewatering Permit shall mean the written approval of EPA to Owners and/or operators of sites that discharge groundwater and/or stormwater from construction dewatering activities discharging to waters of the Commonwealth of Massachusetts. Owner's and/or operators will be required to submit a Notice Of Intent to EPA-New England to be covered by the appropriate general permit and will receive a written notification from EPA-New England of permit coverage and authorization to discharge under the general permit.

Excavation Permit shall mean the written approval to excavate or dig or make a hole or cavity in or under municipal property or interests. Approval will be granted by: the Superintendent of Streets for excavation in the Public Right of Way; the Commissioner for excavation within a municipal park; the City Engineer for excavation within a municipal easement; or their respective designees and shall be authorized only pursuant to a validly issued DPW Approval under Article I Section 8(a)(vi).

Excavation Permit (No Trench) shall mean access to the wastewater or drainage collection system for purposes of inspection or for data gathering. No construction is undertaken as part of this activity and shall be authorized only pursuant to a validly issued DPW Approval under Article I Section 8(a)(i).

Excessive shall mean more than the limits established in these Regulations, directly or by reference, or more than limits determined by the DPW, the MWRA, or other federal, state or local agency to be acceptable.

Floatable oil shall mean oil, fat or grease of animal or vegetable origin, or petroleum derived oil or grease in a physical state such that it will separate by gravity from Waste by treatment in an approved pretreatment facility.

Floor Drain shall mean an intended Drainage point in an otherwise impervious floor, which serves as the point of entry into any subsurface Drainage, treatment, disposal, containment, or other plumbing system.

FOG (Fats, Wax, Oils, and Grease) shall mean the discharge from a food-handling establishment of fats, wax, oils, and grease into the City's wastewater system and shall be authorized only pursuant to a validly issued DPW Approval under Article I Section 8(a)(v). Food handling establishments shall include

commercial/industrial establishments or other establishments as deemed appropriate by the DPW that include as part of their operations the handling, preparation and/or distribution of food.

Garage shall mean any building wherein one or more motor vehicles are serviced, kept or stored and shall include (without limitation) a public or private garage, carport, motor vehicle repair or paint shop, service station, lubritorium, car wash, gasoline station with grease pits or wash racks, or any building used for similar purposes.

Garbage shall mean the animal and vegetable wastes resulting from the domestic or commercial handling, storage, sale, preparation, cooking, or dispensing of food, excluding rubbish.

GPM shall mean gallons per minute.

Grab sample shall mean an individual aliquot collected over a period of time not exceeding 15 minutes.

Grease trap shall mean a receptacle designed to collect and retain or remove grease, oils and fatty substances from Waste normally resulting from the commercial/industrial handling, preparation, processing, cooking or dispensing of food and related equipment. Also called a grease interceptor in the *Uniform State Plumbing Code, 248 CMR 2.00*.

Groundwater shall mean a supply of water under the earth's surface contained within or flowing through a geological formation.

Hazardous Waste shall mean a waste, or combination of wastes, that at the time of discharge:

(a) Is identified as a hazardous waste by EPA pursuant to the *Resource Conservation and Recovery Act, 42 USC 6901, et seq*., and is listed in *40 CFR Part 261*, as amended from time to time;

(b) Has any of the hazardous waste characteristics identified by EPA in *40 CFR Part 261* as amended from time to time;

(c) Has been identified by DEP as a hazardous waste pursuant to *M.G.L. c. 21C* and is listed in *310 CMR 30.000*; as amended from time to time; or

(d) Has any of the hazardous waste characteristics identified by DEP in *310 CMR 30.000*, as amended from time to time.

(e) A waste that would be a hazardous waste pursuant to the EPA or DEP criteria, but for the fact that it is discharged to the sanitary sewer or combined sewer system shall be, for purposes of this definition, a hazardous waste unless it is in Waste which is discharged to the sewer or combined sewer system pursuant to a permit issued under these Regulations and in compliance with the City's and the MWRA's discharge limits.

Illicit connection also called an **illegal connection** shall mean any connection to a stormwater Drain which allows an illicit discharge to a stormwater Drain and any connection which allows stormwater to discharge to a sanitary sewer regardless of whether said connection was previously allowed, permitted, or approved before the effective date of these Regulations.

Illicit discharge shall mean any direct or indirect discharge to the stormwater Drainage system that is not composed entirely of stormwater, except as exempted pursuant to Article V (C)_ Sections 5 and 6. The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or a Surface Water Discharge Permit, or resulting from fire fighting activities. Illicit discharges include a surface or subsurface Drain or conveyance, which allows an illicit discharge into the stormwater Drainage system including sewage, process Waste, or wash water, and any connections from indoor Drains, sinks, or toilets.

Improperly Shredded Garbage shall mean wastes from the domestic and commercial preparation, cooking, and dispensing of food, and from the handling, storage and sale of produce, excluding rubbish and trash, which has particles greater than 1/2 inch or 1.27 centimeters in any dimension so as to prevent the particles from being carried freely under normal flow conditions in Municipal Wastewater system.

Individual Waste disposal system shall mean a privately owned septic tank, cesspool or similar self-contained receptacle or facility which collects, treats or otherwise disposes of Waste as defined under *310 CMR 15.000 (Title 5).*

Industrial Waste shall mean the liquid wastes resulting from the processes employed in industrial, commercial, manufacturing, trade or business establishments as distinct from domestic wastes.

Infiltration shall mean groundwater, surface water or municipal water that enters or leaks into a sanitary or combined sewer through such means as a defective pipe, pipe joint, connection or manhole wall.

Inflow shall mean precipitation or surface runoff that enters a sanitary sewer through such means as downspouts and roof leaders, foundation Drains, yard Drains and area Drains, sump pumps, catch basins, interconnections between storm Drains and sanitary sewers, and defective manhole covers and frames and common manholes.

Inspectional Services Department (ISD) shall mean the Inspectional Services Department of the City of Cambridge.

Interconnection shall mean a physical connection between a sanitary or combined sewer and stormwater Drain which allows the flows to intermix.

Lamphole refers to pipe connecting to the Wastewater system with a wye or tee connection which permits inspection and flushing of the Wastewater system to clear it of heavy obstructions.

Lateral shall mean a Building sewer lateral, a Building Combined sewer lateral or a Building Drain.

Leachate shall mean the water that collects contaminates as it percolates through wastes, pesticides or fertilizers, and may result in hazardous substances entering surface water, groundwater or soil.

Licensed Drain layer shall mean a person authorized in writing by the DPW to install, maintain and repair sanitary sewers, combined sewers, stormwater Drains, building sewer laterals, building combined sewer laterals and building stormwater Drain laterals within the City of Cambridge.

Main shall mean a sanitary sewer Drain, combined sewer Drain or stormwater Drain that collects and conveys flows from other sanitary sewer Drains, combined sewer Drains or stormwater Drains.

Manhole shall mean a structure allowing access to Wastewater and stormwater systems.

Maximum Extent Feasible shall mean technologically possible, or economically feasible in light of best industry standards.

Minimum controls shall mean structures or activities which operators of regulated stormwater systems are required to implement under the Clean Water Act.

Municipal Separate Storm Sewer System (MS4s) or **Municipal Storm Drain System** shall mean the system of conveyances designed or used for collecting or conveying stormwater, including any road with a Drainage system, street, gutter, curb, inlet, piped stormwater Drain, pumping facility, retention or detention basin, natural or manmade or altered Drainage channel, reservoir, and other Drainage structure that together comprise the stormwater Drainage system owned or operated by the City.

MWRA shall mean the Massachusetts Water Resources Authority.

MWRA General Permit shall mean the Permit required and issued by the MWRA that authorizes certain facilities with low industrial flows and no or low levels of regulated pollutants in their industrial Waste to discharge industrial Waste to the MWRA's Wastewater system.

MWRA Group Permit shall mean the Permit required and issued by the MWRA that is applicable to a specific type or types of industrial and commercial processes or discharges.

National Categorical Pretreatment Standard shall mean the requirements under *40 CFR 403.6* and *40 CFR Chapter I, subchapter N*, specifying quantities or concentrations of pollutants or pollutant properties which may be discharged to a publicly-owned treatment works by new or existing sanitary or combined sewer users in specific industrial categories which are established as separate regulations under the appropriate subpart of *40 CFR Chapter I, subchapter N*.

National Pollutant Discharge Elimination System (NPDES) Exclusion shall mean a written determination from EPA that a discharge does not require an NPDES permit.

National Pollutant Discharge Elimination System (NPDES) General Permit shall mean the permit issued by EPA that authorizes a class of discharges such as stormwater associated with industrial activity, non-contact cooling water, construction dewatering, and water treatment backwash.

National Pollutant Discharge Elimination System (NPDES) General Permit **for Construction Dewatering** shall mean the written approval of EPA to Owners and/or operators of sites that discharge groundwater and/or stormwater from construction dewatering activities discharging to waters of the Commonwealth of Massachusetts. Owner's and/or operators will be required to submit a Notice of Intent (NOI) to EPA-New England to be covered by the appropriate general permit and will receive a written notification from EPA-New England of permit coverage and authorization to discharge under the general permit. Owners and operators may be granted authorization to discharge groundwater and stormwater generated wastewaters into waters of Massachusetts. Discharges authorized under this general permit must be treated in a settling basin or other treatment system designed to remove total suspended solids unless the DEP specifically waives that requirement for individual applicant. Construction dewatering activity under this permit is defined as pumped or drained discharges of groundwater and/or stormwater from excavations or other points of accumulation of association with a construction activity.

National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) shall mean the form completed and submitted to the EPA by a person seeking to include a discharge under an NPDES General Permit.

National Pollutant Discharge Elimination System (NPDES) Permit shall mean the permit required and issued by EPA to control point source discharges of pollutants to waters of the United States or separate stormwater Drain systems. It shall also mean the permit issued to the City by the EPA for its combined sewer and stormwater discharges.

National Pretreatment Standard or **Pretreatment Standard** shall mean the general prohibitions and specific prohibitions of *40 CFR 403.5 (a) and (b)*, of the *National Categorical Pretreatment Standards.*

Non-contact cooling water shall mean water used for cooling that does not come into direct contact with any raw material, intermediate product, waste product or finished product.

Non-contact industrial process water shall mean water used in an industrial or manufacturing process, or in the development, recovery, or processing of natural resources that does not come into direct contact with any raw material, intermediate product, waste product, or finished product.

Non-conventional pollutant shall mean any pollutant not defined as a conventional pollutant or a toxic pollutant.

Non point source pollution (NPS) shall mean pollution which occurs when water runs over land or through the ground and picks up natural and human-made pollutants, and discharges them in surface waters or introduces them into groundwater.

Non-stormwater discharge shall mean any waters discharged to the City's Wastewater or stormwater Drainage system which are not composed primarily of rainfall or other precipitation that runs off surfaces during or after a storm.

Oil/water separator shall mean a receptacle designed to separate petroleum-based oil and grease from water. Also called a trap or interceptor.

Outfall shall mean the point of discharge from a stormwater Drain or combined sewer overflow to a water body, wetland or land surface. Also called an outlet.

Owner shall mean a person who alone or jointly or severally with others has the legal title to any premises or has care, charge or control of any premises as agent, executor, administrator, trustee, lessee or guardian of the estate of the holder of legal title.

Particle separator shall mean a receptacle designed and installed to separate sand, grit and oil from water. Also called a solids separator/interceptor.

Person shall mean any agency of the federal government, any agency or political subdivision of the Commonwealth, any State, public or private corporation or authority, individual, trust, firm, joint stock company, partnership, association, or other entity, or any group thereof, and any officer, employee, or agent of such person, and any group of persons.

pH shall mean a measure of the acidity or alkalinity of a substance expressed as standard units, and calculated as the logarithm (base 10) of the reciprocal of the concentration of hydrogen ions expressed in grams per liter of solution.

Point source pollution shall mean pollution caused by any discernible, confined, and discrete conveyance to surface water or groundwater, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, vessel or other floating craft and container.

Pollutant shall mean any element, constituent, or property of Waste, or of agricultural, industrial, manufacturing, or commercial process waste, or leachate, or any other substance which causes the alteration of the chemical, physical, biological, or radiological integrity of water through its introduction therein.

Premises shall mean a parcel of real estate or portion thereof, including any improvements thereon, which is determined by the City to be a single user for purposes of receiving, using and paying for service.

Pretreatment shall mean the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in Waste to a less harmful state prior to or in lieu of discharging or otherwise introducing such pollutants into the Wastewater system. Pretreatment shall include the reduction or alteration of pollutants by physical, chemical or biological processes, process changes, or other means, except as prohibited by *40 CFR Part 403*. Dilution is not pretreatment.

Private combined sewer shall mean a combined sewer, which is not owned by the City, DCR or the MWRA. Private combined sewers include, but are not limited to, building Drains (Waste), building combined sewer laterals and manholes located on private property and not located within an easement held by the City or other public agencies. The owner of the private combined sewer is also responsible for the connection from a private combined sewer to the public Wastewater system.

Private sewer shall mean a sewer that is not owned by the City, DCR or the MWRA. Private sewers include, but are not limited to building Drains (Waste), building sewer laterals and manholes located on private property and not located within an easement held by the City or other public agencies. The owner of the private sewer is also responsible for the connection from a private sewer to the main of the public Wastewater system.

Private stormwater Drain shall mean a stormwater Drain that is not owned by the City or the DCR. Private stormwater Drains include, but are not limited to, building Drains (stormwater), building stormwater Drain laterals, catch basins and manholes located on private property and not located within an easement held by the City and other public agencies. The owner of the private stormwater Drain is also responsible for the connection from a private stormwater Drain to the main of the public stormwater system.

Public combined sewer shall mean a combined sewer that is owned by the City, DCR or the MWRA.

Public record shall mean a "public record" as defined by M.G.L. c. 4 section 7(26).

Public sewer shall mean a sewer, which is owned by the City, DCR or the MWRA.

Public stormwater Drain shall mean a stormwater Drain that is owned by the City or the DCR.

Public ways shall mean any and all portions of the streets and sidewalks in the city of Cambridge, which are open for use by the public.

Receiving waters shall mean any watercourse, river, pond, wetland, ditch, lake, aquifer, ocean or other body of surface water or groundwater that receives a discharge of Wastewater, stormwater or effluent.

Reclaimed water systems shall have the meaning contained in 314 CMR 20.02: Definitions.

Recreational spray or **sprinkler pool** or **recreational fountain** shall mean an outdoor spray or sprinkler pool, which is designed and constructed for the purpose of human contact recreation.

Regulator shall mean a device for regulating the diversion of flow in a combined sewer.

Requirements for Site Plans shall mean the document, which describes the information, which must be included in site plans submitted to the DPW. A Site Plan is required by the DPW for review and approval of a proposed connection, or reconstruction, repair or modification of an existing building sewer lateral, building combined sewer lateral, or building stormwater Drain lateral which connects to the City's wastewater or stormwater Drainage system.

Roof Drain or **roof leader** - See Downspout

Runoff shall mean that part of precipitation, snow melt, or irrigation water, which is not absorbed into the ground. Instead, it flows over the land into streams, other surface bearing water or Drainage structures.

Sanitary sewage shall mean liquid and water-carried human and domestic wastes from buildings, exclusive of ground, storm and surface water, industrial wastes, uncontaminated cooling water, and uncontaminated industrial process water.

Sanitary sewer shall mean a sewer designed to carry sewage.

Septage shall mean the wastes of primarily sanitary sewage origin or industrial wastes that are removed from a cesspool, septic tank, portable toilet, holding tank or similar receptacle.

Sewage shall mean the spent water of a community, which may be a combination of liquid and water-carried wastes from residences, commercial buildings, industrial facilities and institutions, together with

leachate and construction site dewatering, and exclusive of groundwater, surface water, and/or stormwater.

Sewer shall mean a pipe or conduit that carries sewage.

Sewer extension shall mean the addition to a wastewater system of a sanitary or combined wastewater pipe, together with appurtenant works, which when connected to the wastewater system becomes the property of, and is operated and maintained by, the person owning the wastewater system.

Sewer Use Discharge Permit (industrial) shall mean the permit required and issued jointly by the City and the MWRA to a user for the discharge of industrial Waste to the City's or the MWRA's Wastewater system.

Site plan shall mean a plan of land indicating the general location and boundaries of the lot, major anticipated changes in natural features, existing and proposed buildings, pervious and impervious surfaces, existing and proposed curb cuts, infrastructure, topographic, intended changes and external utilities that will be utilized.

Sludge shall mean waste containing varying amounts of solids that is removed from water and Waste through treatment by physical, chemical or biological processes.

Slug shall mean: any discharge to the Wastewater system of a non-routine episodic nature, including but not limited to an accidental spill in a non-customary batch discharge.

(a) that portion of a discharge which contains a pollutant that is prohibited by these Regulations or contains a concentration of a pollutant at least five times above the concentration limit for that pollutant provided in federal or state regulations.

(b) a discharge from a large vat, vessel, or container into the Wastewater system in a manner that:

(i) harms or threatens to harm the Wastewater system, workers or receiving waters;

(ii) contains a pollutant in excess of the requirements of these Regulations;

(iii) causes a violation of any federal or state permit issued to the City; or

(iv) constitutes a discharge of a pollutant without an appropriate permit.

Solid Waste shall mean any unwanted or discarded solid material, consisting of putrescible or nonputrescible solid waste material.

Standard Methods shall mean the current edition of *Standard Methods for the Examination of Water and Wastewater*, as published by the American Public Health Association (APHA), American Water Works Association (AWWA) and the Water Environment Federation (WEF).

Stormwater shall mean any water resulting from rainfall or other precipitation that runs off surfaces during or after a storm.

Stormwater Discharge shall mean the discharge of stormwater to the City's stormwater drainage system and shall be authorized only pursuant to a validly issued DPW Approval under Article I Section 8(a)(iii).

Stormwater Control Permit (SCP) shall mean a permit required by DPW's Land Disturbance Regulations to conduct land disturbance activities that:

(i) disturb one (1) or more acres of land,

(ii) exceed fifty thousand (50,000) square feet of Gross Floor Area,

(iii) have a project parcels(s) equal to or greater than one acre in size,

(iv) include outdoor parking for ten (10) cars or more,

(v) require a Special Permit from the Planning Board, or

(vi) in the opinion of the City Engineer may result in an adverse impact of the municipal Sewer, Combined Sewer, Stormwater Drainage Systems or Water Resources.

Stormwater Drain shall mean a pipe or conduit that carries surface water, stormwater, groundwater or runoff and is exclusive of sewage.

Stormwater Drainage system shall mean pipes, conduits, open channels, pumping stations and appurtenances, including tidegates, catch basins, and manholes used in the collection and transport of Stormwater, Groundwater and runoff.

Stormwater Guidance shall mean the City of Cambridge Wastewater and Stormwater Management Guidance Document and any Directives, a guidance manual issued by the Commissioner pursuant to these Regulations, which is intended to assist in effectively implementing stormwater management, erosion and sediment controls, and operation and maintenance standards and also provides requirements for plan submittals. The Wastewater and Stormwater Management Guidance Document can be amended through the issuance of Directives by the Commissioner.

Stormwater management shall mean regulatory, structural, administrative, managerial, maintenance, physical and chemical measures or devices designed to prevent the discharge of point and non point pollutants to Stormwater Drainage Systems. Also, regulates the rate and quantity of Stormwater Discharge from point and non point sources to receiving bodies of water. Non-structural measures and structural devices are often referred to as best management practices or BMPs.

Substantial rehabilitation shall mean any construction project whose proposed work includes renovation of over 50% of the total building area with 10 or more fixtures replaced or installed.

Surface water shall mean all water appearing on the earth's surface exposed to the atmosphere, such as rivers, lakes, streams, and oceans.

Suspended solids shall mean solids that either float on the surface or are in suspension in water, Waste or other liquids and are removable by laboratory filtering procedures as described in *Standard Methods*.

Termination and Verification shall mean the disconnection of Sewer, Combined Sewer or Stormwater Drainage System connections from a building to the City's Sanitary Sewers, Combined Sewers, or Stormwater Drainage Systems and shall be authorized only pursuant to a validly issued Excavation Permit under Article I Section 8(a)(ii) herein

Toxic organics shall mean organics listed as toxic in federal or state laws or regulations.

Toxic pollutant shall mean any pollutant identified as such in federal or state laws or regulations.

Trade secret shall mean anything tangible, which constitutes, represents, evidences, or records a secret scientific, technical, merchandising, production, manufacturing, or management information, design, process, procedure, formula, invention, method, or improvement.

Treatment system or **pretreatment system** shall mean any and all devices, equipment, or works used in the pumping, storing, treating, recycling, and reclaiming of Sewage, Industrial Waste or Groundwater.

Upset shall mean an exceptional incident in which there is unintentional and temporary noncompliance with the Discharge standards of these Regulations, or any permit thereunder, due to factors beyond the reasonable control of the person responsible for the Discharge. An Upset does not include the following;

noncompliance to the extent caused by operational error, an improperly or inadequately designed treatment facility, lack of preventive maintenance, or careless or improper operation.

User shall mean any person including other MS4s that discharge Waste or Stormwater directly or indirectly into the City's Sanitary Sewers, Combined Sewers or Stormwater Drain, or MWRA interceptors within the City.

Waste shall mean Wastewater and any and all other waste substances whether liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any production, manufacturing or processing operation.

Waste oil shall mean used and/or reprocessed, but not subsequently re-refined, oil that has served its original intended purpose. Waste oil includes, but is not limited to, used and/or reprocessed fuel oil, engine oil, gear oil, cutting oil, and transmission fluid and dielectric fluid. Waste oil does not include oils used in food preparation.

Wastewater shall mean the spent water of a community, which may be a combination of the liquid and water-carried Wastes from residences, commercial buildings, industrial facilities, and institutions, together with any Groundwater and Stormwater that may be present.

Wastewater Discharge (non-industrial) shall mean the non-industrial discharge of Waste to the City's Sewer system and shall be authorized only pursuant to a validly issued DPW Approval under Section 8(a)(iv) herein.

Wastewater system shall mean totality of the devices, equipment or works used in transportation, pumping, storage, treatment, recycling, or reclamation of Waste or in the disposal of the effluent.

Wastewater treatment process shall mean the physical, chemical and biological operations and processes, considered individually or in combination, that are applied at a Waste treatment plant to remove, reduce or alter the pollutant loading of Waste.

ARTICLE II
Use of Wastewater and Stormwater Drainage Systems

Section 1 - Public Wastewater and Stormwater Drainage Systems. The use of all Public Wastewater and Stormwater Drainage Systems in the City, except interceptors of the MWRA's Wastewater System, shall be controlled by the DPW. No person shall, without prior authorization from the DPW, uncover, excavate over, block access to, make any connection with or opening into, alter, or disturb the City's Wastewater or Stormwater Drainage Systems. No person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance, or equipment, which is part of the City's Wastewater or Stormwater Drainage Systems.

Section 2 - Private Wastewater and Private Stormwater Drainage Systems.

(a) All Private Sewers, Private Combined Sewers, Private Stormwater Drains and appurtenant structures that connect to the City's Wastewater or Stormwater Drainage System shall be controlled as to Discharge by the DPW, but constructed, installed, maintained, repaired, and operated by their Owners, at the Owner's expense. All Private Sewers, Private Combined Sewers, and Private Stormwater Drains that connect to the City's Wastewater or Stormwater Drainage Systems shall be constructed, installed, maintained, repaired, and operated to the satisfaction of the DPW. Discharges from Combined or Sanitary Sewers that connect to the City's Wastewater System are also subject to MWRA regulation.

(b) Repairs to Private Sewers, Private Combined Sewers, Private Stormwater Drains and appurtenant structures in the City, including repairs required to comply with these Regulations, shall be made by a licensed drain layer.

Section 3 - Permit to Enter City's Wastewater and Stormwater Drainage Systems. No person shall enter or install equipment into the City's Wastewater or Stormwater Drainage Systems without first obtaining DPW Approval for Collection System Access through an Excavation Permit (No Trench) to enter City Wastewater and Stormwater Drainage Systems in accordance with Article I Section 8 (a)(i) of these Regulations.

Section 4 - Wastewater Connections. The City requires that Waste disposal facilities be connected to its Wastewater System whenever the lack of such connection would endanger public health, create a public nuisance, or impair water quality or the environment. Connection to the City's Wastewater System shall be subject to the availability of capacity in the system as determined by the DPW. Connections shall be made in compliance with all federal, state and local rules, regulations and specifications and at the Owner's expense**.**

Section 5 - Stormwater Drainage Connections. Connection to the City's Stormwater Drainage System shall be made when required by the DPW. Such connections shall be required whenever the DPW determines they are necessary to prevent the endangerment of the public health, the creation of a public nuisance, or the impairment of water quality or the environment, and in such other circumstances as the DPW reasonably deems appropriate. Connections to the City's Stormwater Drainage System shall be made in compliance with all federal, state and local rules, regulations and specifications and at the Owner's expense.

Section 6 - Special Facilities. When required by the DPW a User shall design, construct, install, operate and maintain special facilities, which will provide for the regulation and control of the rate, volume and characteristics of Waste discharged to the City's and MWRA's Wastewater System or Stormwater to the City's Stormwater Drainage Systems. The design of such special facilities shall be subject to the approval of the DPW. Such special facilities shall be designed, constructed operated and maintained at the Owner's expense. The DPW shall have the right to inspect such special facilities in accordance with Article V (A), Section 3 to ascertain compliance with these Regulations.

Section 7 - Ownership and Maintenance of Building Sewer Laterals, Building Combined Sewer Laterals, Building Drains and Building Stormwater Drain Laterals

(a) Building Sewer Laterals, Building Combined Sewer Laterals, Building Drains and Building Stormwater Drain Laterals, whether located on public or private property are the responsibility of and shall be installed and maintained by the Owner of the premises served. In the case where more than one premise is connected to the same Building Sewer Lateral, Building Combined Sewer Lateral, Building Drain or Building Stormwater Drain Lateral, the Owners of the respective premises shall be jointly and severally responsible for the maintenance and repair of the Building Sewer Lateral, Building Combined Sewer Lateral, Building Drain or Building Stormwater Drain Lateral.

(b) The Owner shall at all times keep such Laterals and Drains clean and in good repair in order not to cause excessive infiltration, exfiltration or inflow, depletion of Groundwater, damage to property, odor, or harm to the City's Wastewater and Stormwater Drainage Systems.

(c) The Owner shall maintain, repair, modify or replace an existing Building Sewer Lateral, Combined Sewer Lateral, Building Drain or Building Stormwater Drain Lateral whenever it is determined by the DPW that such Wastewater or Stormwater Drainage Systems may endanger public health, create a public nuisance, result in public or private property damage, harm the City's Wastewater and Stormwater Drainage Systems, result in excessive infiltration, exfiltration or inflow or impair water quality or the environment and in such other circumstances as the DPW deems appropriate.

(d) Building Sewer Laterals, Building Combined Sewer Laterals, Building Drains and Building Stormwater Drain Laterals shall be maintained, repaired, modified or replaced at the Owner’s expense.

Article III
Building Sewer Laterals, Building Combined Sewer Laterals, Building Stormwater Drain Laterals, Connections and Appurtenances

Section 1 - Separate Building Sewer Laterals and Building Stormwater Drain Laterals. Separate and independent Building Sewer Laterals and Building Stormwater Drain Laterals shall be provided for all new or Substantially Rehabilitated buildings. Where one building stands behind another on an interior lot, and no private sewer or stormwater drain is available or can be constructed to the rear of the building through an adjoining alley, court, yard, or driveway, the Building Sewer Lateral, Building Combined Sewer Lateral or Building Stormwater Drain Lateral may be extended from the front building to the rear building provided that prior written approval and all necessary permits for the extension are obtained from the DPW, the Inspectional Services Department (ISD) and the Cambridge Public Health Department (CPHD).

Section 2 - Existing Building Sewer Laterals, Building Combined Sewer Laterals and Building Stormwater Drain Laterals. If the DPW approves, and the Owner obtains all necessary permits, including a DPW Approval if required pursuant to Article I, §8, existing Building Sewer Laterals, Building Combined Sewer Laterals and Building Stormwater Drain Laterals may be used to accommodate new Wastewater or stormwater. The costs of any examination and testing required by the DPW as a precondition to such approval shall be at the Owner's expense.

Section 3 - Gravity Discharge to Sewer, Combined Sewer and Stormwater Drains. All Building Sewer Laterals, Building Combined Sewer Laterals and Building Stormwater Drain Laterals shall discharge by gravity to the City sewer, combined sewer or stormwater drain. The Building Drain shall be brought to the building at an elevation below the basement floor. In all new or substantially rehabilitated buildings in which any Building Sewer Lateral, Building Combined Sewer Lateral or Building Stormwater Drain Lateral is too low to permit gravity discharge, wastewater, stormwater or Groundwater shall be lifted by an approved means and allowed to discharge by gravity (i.e., not under pressure) to the City sewer, combined sewer or stormwater drain if approved by the Commissioner or his/her representative and the Owner obtains all necessary permits and obtains a DPW Approval pursuant to Article I, §8.

Section 4 - Wastewater-Stormwater Separation.

(a) The plumbing of any new or substantially rehabilitated building shall be so constructed as to keep all stormwater, surface water, groundwater, roof and surface runoff, subsurface drainage, uncontaminated cooling water, and non-contact industrial process water separate from sanitary sewage and industrial wastes, and from the Building Sewer Lateral.

(b) The building drain conveying sewerage from plumbing fixtures within the building shall discharge to a building sewer lateral, while the building drain conveying stormwater and other drainage shall discharge to a building stormwater drain lateral.

(c) Where separate Stormwater Drains and Sanitary Sewers are provided and where the DPW has determined that on-site retainage of stormwater is not possible, Building Stormwater Drain Laterals shall be connected to a Stormwater Drain. Connection of a Building Stormwater Drain Lateral to a Sanitary Sewer is prohibited.

(d) Where separate Stormwater Drains and Sanitary Sewers are provided, Building Sewer Laterals shall be connected to a Sanitary Sewer. Connection of a Building Sewer Lateral to a Stormwater Drain is prohibited.

(e) For existing properties where only a Combined Sewer has been provided by the City, and the DPW has determined that sewer separation and on-site retainage of stormwater is not feasible, the separate Building Stormwater Drain Lateral may be connected to the Building Sewer Lateral or Building Combined Sewer Lateral in a manner prescribed by the *Cambridge Wastewater and*

Stormwater Management Guidance Document and the Building Sewer connection shall be made to such Combined Sewer.

(f) The DPW shall require an Owner to eliminate a source of Infiltration or Inflow to the sanitary sewer system or the combined sewer system whenever the DPW determines that the source results in excessive Infiltration or Inflow.

Section 5 - Connections to Combined Sewer Overflows. In order to prevent the direct discharge of wastewater to receiving waters under dry weather conditions, a Building Sewer Lateral or Building Combined Sewer Lateral shall not be connected to a Combined Sewer Overflow.

Section 6 - Connections to Manholes. Building sewer connections for new or Substantially Rehabilitated buildings shall not be made directly to City-owned manholes unless expressly authorized by the issuance of a DPW Approval pursuant to Article I, §8.

Section 7 - Connections to Catch Basins. Private drains, including but not limited to, Building Stormwater Drain Laterals for new or existing buildings, and drains from irrigation systems shall not be connected directly to catch basins unless specifically authorized by the issuance of a DPW Approval pursuant to Article I, §8.

Section 8 - Connections from Individual Wastewater Disposal Systems. Connection of an individual wastewater disposal system, whether directly or indirectly to a City sanitary sewer, combined sewer, or stormwater drain is prohibited.

Section 9 - Dye Testing of Connections.

(a) Prior to activating stormwater or wastewater service, DPW may require that a Building Sewer Lateral or Building Combined Sewer Lateral shall be dye tested by the DPW, or by the Owner or his/her designee in the presence of a DPW and/or ISD inspector, to establish that the Building Sewer Lateral or Building Combined Sewer Lateral is properly connected to the City's wastewater system. The DPW may conduct dye testing of an existing building's wastewater system to establish that it is properly connected to the City's wastewater system. The DPW may require the Owner forthwith to eliminate a connection from a Building Sewer Lateral or a Building Combined Sewer Lateral to a stormwater drain (also referred to an illicit or illegal connection) at the Owner's expense.

(b) Where separate sanitary sewers and stormwater drains exist, the DPW may also dye test, or require the Owner to dye test in the presence of a DPW inspector, a new or existing Building Stormwater Drain Lateral to establish that the Building Stormwater Drain Lateral is properly connected to the City's Stormwater Drainage System. The DPW may also require the Owner forthwith to eliminate a connection from a Building Stormwater Drain Lateral to a sanitary sewer at the Owner's expense.

Section 10 - Backwater Valves. All existing or new building drains from plumbing fixtures subject to backflow from a public sewer or combined sewer, or a private sewer or combined sewer connected to a public wastewater system which is subject to backflow, shall be required to have backwater valves installed at the Owner's expense. Any plumbing fixture located at an elevation below the surface elevation of the roadway containing the public wastewater system serving the fixture shall be considered to be subject to backflow. Backwater valves shall be installed in accordance with the *Uniform State Plumbing Code, 248 CMR, Section 2.09:(4) and the DPW's Requirements for Site Plans.*

Section 11 - Cleanouts. Where a new building is to be constructed which is set back three feet or more from the property line, the City has the authority to require the Owner to install a cleanout on the portion of the Building Sewer Lateral, Building Combined Sewer Lateral or Building Stormwater Drain Lateral on the Owner's property.

Section 12 - Floor Drains. Floor drains shall be connected to the Building Sewer Lateral or Building

Combined Sewer Lateral.

Section 13 – Oil/Water Separators for Garages.

An Owner of a building or business requiring an oil/water separator pursuant to these Regulations or state regulations shall be required to obtain DPW Approval under Article I, §8, must notify the MWRA in accordance with 360 CMR 10.016, and which shall comply with the following:

(a) Oil/water separators shall be required on sewers or combined sewers directly or indirectly tributary to the City's wastewater system from existing and new garages, services stations, enclosed parking areas, and other establishments capable of discharging petroleum-based oil or grease, flammable wastes, sand, or other harmful substances. Discharges from oil/water separators shall be directed to a sanitary or combined sewer and not to a stormwater drain.

(b) The determination as to whether an oil/water separator is required rests with the DPW and the MWRA. The size, type, capacity, location and construction of all oil/water separators shall be approved by the DPW and by MWRA, and shall be located so as to be readily accessible for maintenance and inspection. The DPW shall have the right to inspect such facilities in accordance with Article V (A), §3 of these Regulations.

(c) Where oil/water separators are required, they shall be installed and maintained continuously to satisfactory and effective operation by and at the expense of the Owner or User. Both the Owner of the premises where an oil/water separator is required and the Owner or operator of the establishment or business conducted on the premises shall be jointly and severally responsible for installing an oil/water separator acceptable to the DPW, and for properly servicing and maintaining an oil/water separator.

(d) The Owner or operator of the establishment or business conducted on the premises where the oil/water separator is located shall maintain a log describing the date and type of all services and maintenance performed in connection with the oil/water separator, the identity of the person who performed the service or maintenance, the amount of residue removed from the oil/water separator on each date, and the method of disposal of the residue. The log entries shall be maintained for six years and shall be made available for inspection and copying by the DPW or MWRA. The schedule for service and maintenance of an oil/water separator shall be subject to approval by the DPW and the MWRA.

(e) In addition to complying with these Regulations, oil/water separators shall conform to the regulations of the *State Uniform Plumbing Code, 248 CMR 10:000*, *360 CMR 10.000* and all other applicable laws.

Section 14 - Particle Separators.

An Owner of a building or business requiring a particle separator pursuant to these Regulations shall be required to obtain DPW Approval under Article I, §8, which shall comply with the following:

(a) Particle separators shall be required on all newly constructed stormwater drains which connect directly or indirectly to the City's stormwater drainage system, or which discharge to water resources, from existing and new outdoor parking or paved areas. Particle separators shall be required on existing stormwater drains from existing or expanded outdoor parking lots or paved areas whenever appropriate as determined by the DPW. Particle separators shall be designed, installed, and maintained in accordance with the *Cambridge Wastewater and Stormwater Management Guidance Document.* The DPW shall have the right to inspect such facilities in accordance with Article V (A), §3 of these Regulations.

(b) The Owner of the particle separator shall maintain a log describing the date and type of all service

and maintenance performed in connection with the particle separator, the identity of the person who performed the service or maintenance, the amount of residue removed from the particle separator, and the method of disposal of the residue. The log entries shall be maintained for six years and shall be made available for inspection and copying by the DPW. The schedule for service and maintenance of a particle separator shall be subject to approval by the DPW.

Section 15 - Grease Traps.

An Owner of a building or business requiring grease trap pursuant to these Regulations or state regulations shall be required to obtain DPW Approval under Article I, §8, which shall comply with the following:

(a) Grease traps shall be installed as specified by and maintained in accordance with the *State Uniform Plumbing Code* and the *Cambridge Wastewater and Stormwater Management Guidance Document* so that the discharge concentration of fats, wax, oils or grease does not exceed 300 mg/l from the Building Sewer Lateral or Building Combined Sewer Lateral.

(b) Waste removed from grease traps shall not be discharged into the wastewater system. The Owner shall be responsible for the proper disposal of such waste.

(c) Chemical, biological, or physical means (including flushing with water) shall not be used to release fats, wax, oil or grease into the wastewater system, bypass the trap, or otherwise make the trap operate less effectively. With prior approval from the MWRA and the DPW a chemical or biological agent may be added to convert the fats, wax, oil and grease. The resulting discharge from the trap shall not cause or contribute to an obstruction or blockage in the wastewater system or otherwise violate these Regulations. Unless so converted, the fats, wax, oil and grease contents of a grease trap shall not be discharged to the wastewater system.

(d) The Owner of a building or business that is required by Massachusetts law or regulations to have a grease trap or grease interceptor for food related grease or oil shall:

(1) Inspect its grease traps and interceptors at least monthly, and

(2) Have its grease traps and interceptors cleaned, with their contents hauled for disposal, whenever the level of grease is at least 25% of the effective depth of the trap, or at least every three months, whichever is sooner.

Section 16 – Fats, Wax, Oils and Grease (FOG) Sampling

An Owner of a building or business required to install a sampling port or sampling manhole pursuant to these Regulations shall be required to obtain DPW Approval under Article I, §8, which shall comply with the following:

(b) DPW may require a food handling facility to install a sampling port or sampling manhole in accordance with the provisions of Article II, §6 in these Regulations. Where sampling ports are required, they must be installed on the discharge line from the facility before it connects to the City's sewer or combined sewer systems. Sampling ports must be installed in a safe and accessible location prominently identified and approved by DPW. No source of FOG from a facility may be introduced to the discharge line downstream from the sampling location. If a facility has more than one discharge line from the kitchen, sampling ports may be installed on each line if so required by DPW. If it is determined by DPW that there is insufficient space at a facility for a sampling port, or if the discharge line is inaccessible, DPW will conduct sampling at a downstream location to verify FOG discharge. If DPW finds that FOG levels downstream from two or more food handling facilities without sampling ports exceed the FOG limit, DPW shall have the authority to require any or every facility to implement and document the Best Management Practices as described in *Cambridge*

(b) Sampling can be conducted by DPW at unannounced times. All sampling, testing and analysis will be performed in accordance with the provisions of Article V (A), §3 and §5 of these Regulations.

(c) Compliance with the FOG limit specified in Article V (B), §2(t) of these Regulations will be assessed from samples taken at the sampling location. In the event of a violation, DPW may take any enforcement action authorized under Article VII in these Regulations.

Article IV
Requirements for Design and Construction of Facilities

Section 1 - Design and Construction Standards. New building sewer laterals, building combined sewer laterals, building stormwater drain laterals, other private sewers, combined sewer, stormwater drains, grease traps, oil/water separators, particle separators, appurtenances, and other wastewater or stormwater facilities tributary to the City's wastewater and stormwater drainage systems shall be designed and constructed in conformance with current DPW standards and specifications. In the absence of such specifications, the materials and procedures set forth in *the American Society for Testing and Materials*, the *WEF Manual of Practice No. 9, Design and Construction of Urban Stormwater Management Systems and Gravity Sanitary Sewer Design and Construction, New England Interstate Water Pollution Control Commission Guides for the Design of Wastewater Treatment Works, Title V of the State Environmental Code* and the *Uniform State Plumbing Code, 248 CMR 2.00* or their amendments shall apply, subject to the prior written approval of DPW.

Section 2 – Excavation Permit Application Required for DPW Approval for Building Sewer Lateral, Building Combined Sewer Lateral or Building Stormwater Drain Lateral Connection.

(a) The Owner shall complete and submit to the DPW an Excavation Permit application prior to the construction of a new building sewer lateral, building combined sewer lateral or building stormwater drain lateral, or reconstruction, repair, or modification of an existing building sewer lateral, building combined sewer lateral or building stormwater drain lateral which connects to a City sanitary sewer, combined sewer or stormwater drain, or to an MWRA interceptor within the City.

(b) The application shall be supplemented by building site plans, which have been approved in advance by the City Engineer, or by such other permits, plans, specifications, and information as the DPW may require. Building site plans shall be prepared in accordance with the *DPW's requirements for site plans*. Applicable fees shall be paid at the time the Excavation Permit application is filed at a rate determined annually by the DPW.

(c) Construction, reconstruction, repair or modification of the building sewer lateral, building combined sewer lateral or building stormwater drain lateral shall not proceed until DPW Approval has been obtained. A DPW inspector will be assigned to inspect construction, reconstruction, repair or modification of the building sewer lateral, building combined sewer lateral or building stormwater drain lateral and connection to a City sanitary sewer, combined sewer or stormwater drain.

Section 3 - Connection and Extension Permit Required. No person shall connect to a City sanitary or combined sewer or directly to an MWRA sewer or construct a sewer extension which ultimately connects to a City or to an MWRA sewer without the appropriate DPW Approval, and, if applicable, a Sewer System Extension and Connection Permit from DEP in accordance with 314 CMR 7.

Section 4 - Direct Connection to MWRA Sewers. A Direct Master (Direct Connection) Permit application to the MWRA must be approved in advance by the DPW. Where a person seeks to make a direct connection to an MWRA sewer, the DPW shall require the person to supply such information as would enable the DPW to determine whether to approve the application. Within 10 days after receiving a Direct Connection Permit from the MWRA, the permittee shall provide a copy of the permit to the DPW.

Section 5 - Bonding Requirements. The DPW shall have the right to require that any person proposing to construct, repair or modify a building drain, building sewer lateral, building combined sewer lateral, building stormwater drain lateral, other private sewer, grease trap, oil trap, and other wastewater facility tributary to the City's wastewater and stormwater drainage systems post a bond in a form satisfactory to the City and in an amount and for a period of time that the DPW deems sufficient to guarantee construction quality and operating performance.

Section 6 - Bonded Drain Layer. All building sewer lateral, building combined sewer lateral and building stormwater drain lateral installation, repair or maintenance work shall be performed by a bonded drain layer. A drain layer's bond, using the City's standard bond form as then in effect, must be submitted to and approved by the DPW in advance of installation, repair or maintenance.

Section 7 - Violations to be Reported. All licensed drain layers are required to give a full written report to the DPW within 24 hours if, in the course of performing their work:

(a) prohibited substances are found in a building drain, building sewer lateral, building combined sewer lateral or building stormwater drain lateral, or plumbing is found that would allow discharges of such substances to a building drain, building sewer lateral, building combined sewer lateral or building stormwater drain lateral;

(b) interconnections or illicit connections are observed;

(c) a defect or deterioration of the building drain, building sewer lateral, building combined sewer lateral or building stormwater drain lateral is observed; or

(d) a defect or deterioration of the City's sanitary sewer, combined sewer or stormwater drain is observed.

Failure to provide such reports may lead to license suspension or in the case of repeated violations, to license revocation.

Section 8 - Right to Inspect During Construction. The DPW shall have the right to inspect all building drains, building sewer laterals, building combined sewer laterals, building stormwater drain laterals, and other private sewers, private stormwater drains, grease traps, oil traps, particle separators and other facilities, at any reasonable time while such construction is underway. The owner shall notify the DPW when such facility is installed and ready for final inspection and before the facility is connected to the City's wastewater and stormwater drainage systems. Connection to the City's wastewater and stormwater drainage systems shall be made in the presence of a DPW inspector. No facility shall be covered over until approval has been given by the DPW inspector.

Section 9 – Illicit Connections to the Stormwater Drain. Every newly constructed, replaced or extended building sewer lateral or building combined sewer lateral that discharges directly or indirectly to the City's stormwater drainage system shall be designed or constructed to disconnect from the City's stormwater drainage system and connect to the City's sanitary or combined sewer system as required by the DPW.

Section 10 – Inflow and Infiltration. Every newly constructed, replaced or extended building sewer lateral or combined sewer lateral that discharges directly or indirectly to the City's sanitary or combined sewer system shall be designed, constructed and maintained so as to minimize to the Maximum Extent Feasible all Inflow and Infiltration into the City's sanitary or combined sewer system. The DPW may require an Owner to determine and eliminate the source of the Infiltration or Inflow and/or any and all contaminated sources of Infiltration or Inflow to an existing Building Sewer Lateral or Building Combined Sewer Lateral at the Owner's expense.

Section 11 - Construction of Below-grade Plumbing. All plumbing fixtures located at an elevation below the adjacent roadway elevation which contains the City sanitary or combined sewer serving the proposed plumbing shall be considered to be subject to backflow and shall be equipped with a backwater valve in accordance *with 248 CMR Section 2.09(4) of the Uniform State Plumbing Code*, the *DPW's requirements for site plans*, and *780 CMR Section 10.15 (ii) of the State Building Code.* The backwater valve shall be installed and maintained at the Owner's expense.

Section 12 – Distance from Water Services. Building sewer lateral, building combined sewer lateral and building stormwater drain lateral connections shall be laid at least 10 feet apart horizontally and 18

inches apart vertically from any new or existing water service connection in accordance with DEP regulations.

Section 13 - Fuel Dispensing Areas. Any area which is used to dispense fuel and is covered by a canopy or other type of roof or enclosure shall drain into an approved oil/water separator and then into a sanitary sewer, or if not available, a combined sewer. As an alternative, it is permissible to contain all runoff within the fuel dispensing area so that it is not drained off. The owner shall be responsible for the removal and disposal of any runoff, which is contained in such a manner. The fuel dispensing area shall be graded so as to prevent any runoff to surrounding areas, which drain into a stormwater drain. Runoff from canopies of gas stations and from fuel dispensing areas not in a building or covered by a canopy shall be drained according to the *Cambridge Wastewater and Stormwater Guidance Document* or, in the absence of such guidance, as prescribed by the City Engineer.

Section 14 - Stormwater Management. On-site retainage of stormwater and implementation of other stormwater management measures to control the rate, volume and characteristics of stormwater discharged to the City's combined sewer or stormwater drainage systems shall be required whenever appropriate, as determined by the DPW. Every person seeking to establish a new connection to the City's combined sewer or stormwater drainage system or to reconstruct, repair or modify an existing connection for a facility undergoing expansion or rehabilitation shall be required to obtain DPW Approval and may be required to prepare and implement a stormwater management plan. Such a plan may include non-structural and structural measures to manage stormwater during and after construction of the new or expanded facility. The design and maintenance of such facilities shall be subject to the approval of the DPW in accordance with the DPW's Land Disturbance Regulations and the *Cambridge Wastewater and Stormwater Guidance Document* and shall meet all current state and federal regulations. The design, installation and maintenance of such facilities shall be at the facility Owner's expense. The DPW shall have the right to inspect such facilities in accordance with this article and Article V (A), §3 of these Regulations.

Section 15 - Decorative Fountains. New or substantially rehabilitated decorative fountains shall be equipped with a shut off mechanism and shall be designed and constructed so as to re-circulate water. Decorative fountains shall discharge to a stormwater drain.

Section 16 - Recreational Spray and Sprinkler Pools. New or substantially rehabilitated recreational spray and sprinkler pools, also known as recreational fountains, shall be equipped with a shut off mechanism and shall be designed and constructed so as to be nonrecirculating. Recreational spray and sprinkler pools shall discharge to a stormwater drain.

Section 17 – Sanitary Sewer Holding Tanks. On-site retainage of sanitary sewage to control the rate and volume of discharge of sewage to the City's sanitary sewer or combined sewer system shall be required whenever appropriate, as determined by DPW. Every person seeking to establish a new connection to the to the City's sanitary system or combined sewer system or to reconstruct, repair or modify an existing connection for a facility undergoing expansion or rehabilitation may be required to install a sanitary holding tank. The design and maintenance of such facilities shall be subject to the approval of DPW and shall meet all current state and federal regulations. The design, installation and maintenance of the sanitary sewer holding tank shall be at the Owner's expense. The sanitary sewer holding tank must be maintained and remain operable at all times. Failure to maintain the sanitary holding tank in operable condition shall be considered a violation of these Regulations and subject to enforcement under Article VII of these Regulations. The DPW shall have the right to inspect sanitary holding tanks in accordance with this article and Article V, (A), § 3 of these Regulations.

Section 18 - Termination of Service. Every person seeking to obtain a Demolition Permit from the City's Inspectional Services Department to demolish part or all of a structure shall submit a completed DPW Approval (Termination & Verification), which requires sign-off by DPW. Prior to demolition of any building, the Owner shall obtain a DPW Approval to cut and cap all building sewer laterals, building combined sewer laterals and building stormwater drain laterals at the connection to the sanitary or combined sewer or stormwater drain, and have the DPW inspect all building sewer laterals, building

combined sewer laterals and building stormwater drain laterals to ensure that they are properly cut and capped prior to back-filling.

Section 19 - **Expenses Borne by the Owner**. All costs and expenses incident to the application for the design, construction, installation, connection, repair, and maintenance of a building sewer lateral, building combined sewer lateral, building stormwater drain lateral, other private sewers or stormwater drains, special facilities, particle separators, grease traps, oil traps, or other wastewater or stormwater drainage facilities shall be borne by the Owner. Notwithstanding the forgoing the City may, in its discretion, bear part or all of such costs and expenses pursuant to Cambridge Municipal Code §13.16.020(C). The Owner shall indemnify the City from, and shall reimburse the City for, any loss or damage directly or indirectly occasioned by the installation, use or operation of any building sewer lateral, building combined sewer lateral, building stormwater drain lateral, private sewer or stormwater drain, special facility, particle separator, grease trap, oil/water separator or other wastewater or stormwater facility.

Section 20 – Extension, Replacement or Relocation of Sanitary Sewer, Combined Sewer and Stormwater Drains. Any person may propose an extension, replacement or relocation of a City sanitary sewer, combined sewer or stormwater drain to serve a new or rehabilitated building. Every person who proposes to extend, replace or relocate a City sanitary sewer, combined sewer or stormwater drain shall prepare and submit for review and approval by the DPW a construction plan, and such other permits, plans, specifications, to include, if applicable, a Sewer System Extension and Connection Permit from DEP in accordance with 314 CMR 7 and any other information the DPW deems necessary to determine whether to approve the request. Extension, replacement or relocation of a City sanitary sewer, combined sewer or stormwater drain shall not commence without the DPW's prior written approval and the approval of any other state agency that governs the approval of sewer extensions. Every extension, replacement or relocation of a City sanitary sewer, combined sewer or stormwater drain shall be designed and constructed in accordance with the DPW's design requirements, specifications and standard details. Any tests, studies, investigations and inspections required for design and construction shall be conducted in accordance with the City's requirements. All expenses incurred pursuant to the extension, replacement or relocation of a City sanitary sewer, combined sewer or stormwater drain including but not limited to, application, engineering, legal permitting, construction and inspection costs shall be borne by the applicant. The Owner shall indemnify the City from, and shall reimburse the City for, any loss or damage directly or indirectly occasioned by the extension, replacement or relocation of a City sanitary sewer, combined sewer or stormwater drain including but not limited to, application, engineering, legal permitting, construction and inspection costs.

Section 21 - Bonding Requirements for Sanitary Sewer, Combined Sewer or Stormwater Drain Extensions. Before extending, replacing or relocating a public sanitary sewer, combined sewer or stormwater drain the contractor shall (a) be approved in writing by the City, and (b) post a performance bond with the DPW in an amount and form acceptable to the City.

Section 22 - Transfer Agreement. After constructing a DPW approved public sanitary sewer, combined sewer or stormwater drain extension, replacement or relocation, the Owner shall transfer ownership of the sanitary sewer, combined sewer or stormwater drains to the City through a Transfer Agreement in a form prescribed by the City. The Transfer Agreement shall be accompanied with as-built plans and easements if required for the extended, replaced or relocated sanitary sewer, combined sewer or stormwater drain and any other conditions or information required by the DPW. Until such time as the Transfer Agreement is signed by the City, the extended, replaced or relocated sanitary sewer, combined sewer or stormwater drain shall be considered to be privately owned by the applicant and shall be subject to the requirements pertaining to private sanitary sewers, combined sewers or stormwater drains contained in these Regulations.

Section 23- DPW Denial of Modification of Proposal. The DPW may deny a request to extend, replace or relocate a public sanitary sewer, combined sewer or stormwater drain, or the DPW determines that proposed construction is incompatible with the DPW's or MWRA's sanitary sewer, combined sewer or stormwater drainage systems, the DPW's design requirements, or these Regulations. The DPW may condition its approval of a request to extend, replace or relocated a public sanitary sewer, combined

sewer or stormwater drain. Such conditions may include, but are not limited to, the requirement to install a pipe larger than the size required to serve the applicant.

Article V
Discharge Requirements, Prohibitions and Restrictions

A. GENERAL REQUIREMENTS

Section 1 - Compliance with Discharge Limits. Every User who directly or indirectly discharges wastewater to the City's sanitary or combined system or stormwater to the City's stormwater drainage systems shall comply with the strictest of the following discharge limits applicable to the discharge: the National Pretreatment Standards, NPDES Permit conditions, state limits, MWRA, local or permit limits, limits contained in these Regulations, and limits in a permit or order issued under these Regulations. If a *National Categorical Pretreatment Standard* includes a limit in addition to a daily maximum limit (e.g., 30 day, monthly, weekly, four day, loading, or production-based limit), that limit must also be met.

Section 2 - Dilution Prohibited. No User shall achieve, or attempt to achieve, compliance with these Regulations by diluting a discharge instead of using proper pretreatment. The increased use of process water in place of proper treatment shall be considered dilution and is prohibited by these Regulations.

Section 3 - Inspection

(a) The DPW may inspect the facilities of any User to the City's sanitary system, combined system, or stormwater drainage system to determine compliance with the requirements of these Regulations. The User shall allow the DPW to enter upon the premises of the User for the purposes of inspection, sampling, photographic documentation or record examination and copying. The DPW shall also have the right to install or to have installed on the User's property at the property owner's expense such devices as are necessary to conduct sampling, inspection, compliance monitoring and metering operations as referenced in this Article.

(b) Conditions for entry:

(i) The DPW shall present appropriate credentials at the time of entry.

(ii) The purpose of the entry shall be for inspection, observation, measurement, sampling, testing, photographic documentation, or record examination and copying in accordance with the provisions of these Regulations.

(iii) Any entry shall be made at reasonable times during normal operating hours unless an emergency situation exists which endangers the public health, safety and welfare of the community as determined by the DPW, in which case the DPW may make an emergency entry and provide notice of entry to the discharger as soon as reasonably practicable.

(c) If the DPW is refused access to any part of the premises from which stormwater or waste is discharged, and DPW believes that there may be a violation of these Regulations, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with these Regulations or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the DPW shall, with the assistance of the City Solicitor, seek any and all remedies available under federal, state and local laws or regulations, and the User and/or Owner of the premises shall be liable for all fines, fees, penalties, and all costs of enforcement, including but not limited to attorneys fees.

Section 4 - Monitoring Facility Requirements.

(a) When required by the DPW, a User shall install and maintain at the Owner's expense suitable control or measuring devices, together with manholes, chambers, meters, sampling ports, and other appurtenances in its building sewer laterals, building combined sewer laterals or building stormwater

drain laterals, including those from pumps, to facilitate discharge observation, monitoring, sampling and measurement.

(b) Such manholes, chambers or meters shall be safely accessible and shall be located and constructed in accordance with site plans approved by the DPW, shall be installed by and at the expense of the Owner, and shall be maintained by the Owner in good operating condition at all times.

(c) All such meters and other measuring devices shall be approved by the DPW prior to installation and use. All such meters and measuring devices shall be calibrated by the Owner so as to ensure accurate measurement. The facilities shall be constructed in accordance with all applicable construction standards. Construction shall be completed in compliance with a time schedule established by the DPW.

(d) The DPW requires permittees to keep and retain all records associated with meters, measuring devices and samplers. These records shall include data on volumes, water quality and maintenance.

(e) All records from meters, measuring devices and samplers, whether required by DPW or not, shall be kept for at least six years and furnished to the DPW upon request. During construction and after installation, the DPW shall have the right to inspect the facilities in accordance with this Article.

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Section 5 - Sampling and Analysis.

(a) All measurements, tests and analyses of the characteristics of wastewater or stormwater required to conform to these Regulations shall be performed in accordance with the most recent edition of *Standard Methods for the Examination of Water and Wastewater*, unless otherwise authorized or required by the DPW, MWRA, EPA or DEP.

(b) Sample analysis required by these Regulations, or any permit issued hereunder, shall be performed by an independent laboratory currently certified by the DEP for the parameters being analyzed. The use of a laboratory with provisional DEP certification is prohibited.

(c) Samples analyzed shall be collected at locations designated by the DPW and by methods acceptable to, and at a frequency determined by, the DPW. The DPW will stipulate whether a composite or grab sample should be taken and whether composite samples will be time or flow weighted.

(d) The DPW may require a permittee to submit a complete data package, including chain of custody records, raw data, and quality assurance/quality control related results, with a report required by the DPW. The DPW may require that discharge monitoring reports be submitted on paper copy, or by electronic means.

Section 6 - Compliance Measurement Location. All limitations imposed by these Regulations shall be applied at the end of the pretreatment process line, or at the end of the process line if there is not pretreatment. The Owner or User shall not introduce a Pollutant into a wastewater or stormwater stream after the compliance measurement location without prior approval of DPW.

Section 7- Notification of Changed Discharge. Every User who directly or indirectly discharges to the City's wastewater or stormwater drainage system shall notify the DPW in advance of (a) any substantial change in the volume or character of pollutants in the discharge; and (b) any change in the location of the discharge to a different sanitary sewer, combined sewer or stormwater drain connection.

Section 8 - Notification of Violations and Remediation Actions.

(a) A notification of violation will be issued for discharges of otherwise permitted flows in quantities or of such size as to be capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the City's wastewater system.

(b) Users shall notify the City Engineer immediately upon discharging wastewater or stormwater in violation of these Regulations or their permits, and of any Upset Slug load, or spill that may reasonably be expected to discharge to the wastewater or stormwater drainage systems.

(c) Each notification shall be followed within 15 days of the date of occurrence by a detailed written statement addressed to the City Engineer describing the causes of the discharge and the remediation measures being taken to prevent a recurrence. Such notification will not relieve Users of liability for any expense, loss or damage to the City's wastewater or stormwater drainage systems, or for any fines imposed on the City due to such discharge.

(d) In the case where a discharge to the wastewater system violates these Regulations or a permit, the User shall also notify the Director of the MWRA's Sewerage Division immediately. Such notification shall be followed by any additional actions required by the MWRA.

(e) In the case were a discharge to the stormwater drainage system violates these Regulations or a permit, the User shall also notify DEP and EPA immediately. Such notification shall be followed by any additional actions required by the DEP or EPA.

Section 9 - Preventative Measures. Each User shall provide reasonable and appropriate protection from any discharge, including accidental discharges or potential to discharge in violation of these Regulations.

Section 10 - Confidentiality of Data and Documents.

All information and data regarding any User, whether obtained from reports, questionnaires, permit applications, permits, monitoring programs, or inspections shall be maintained in accordance with the Massachusetts Public Records Law.

B. DISCHARGE PROHIBITIONS AND RESTRICTIONS APPLICABLE TO THE WASTEWATER SYSTEM.

Section 1 - General Prohibitions. No persons shall discharge or cause or allow to be discharged into a City sanitary or combined sewer or into a sanitary or combined sewer tributary thereto, any substances, waters or wastes that the City and /or the MWRA through its regulations has identified as likely, either singly or by interaction with other substances, to:

(a) harm or interfere with any wastewater system, wastewater treatment facility, or wastewater treatment process.

(b) Cause pass through, interfere with or be otherwise incompatible with the wastewater treatment process or sludge disposal;

(c) cause or result in blockage of flow;

(d) cause a violation of federal or state law or any discharge permits issued to either the City, the State or the MWRA;

(e) cause a violation of federal or state water quality standards or otherwise adversely affect the receiving waters;

(f) endanger or threaten to endanger life, limb, health, or welfare of any person(s) or the public health, safety, welfare, or the environment, or property; or

(g) constitute a nuisance.

Section 2 - Prohibited Wastes or Substances. No person shall discharge or cause or allow to be discharged directly or indirectly into a City sanitary or combined sewer or into a sanitary or combined sewer tributary thereto any prohibited wastes or substances as specified hereunder or as further specified by DEP, EPA or the MWRA such that the most restrictive requirement is applicable. The prohibited waste or substances include, but are not limited to the following:

(a) Fuel oil, crude oil, lubricating oil, or any other oils or greases of hydrocarbon or petroleum origin in excess of 15 milligrams per liter.

(b) Any wastewater discharge from any building or facility served by a private water supply without having first obtained a validly issued DPW Approval.

(c) Swimming pool water unless there is no reasonable alternative as determined by the City and MWRA and upon written approval by the City and the MWRA, which will not be given when a receiving sewer has insufficient capacity to handle the discharge.

(d) Any liquid, solid, or gas including but not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides and methyl ethyl ketone, which by reason of its nature or quantity is or may be sufficient, either alone or by interaction with other substances, to create a fire or explosion hazard or to be otherwise injurious to the wastewater system, or to receiving waters, including:

    (i) Wastewater with a closed cup flashpoint of less than 140 degrees Fahrenheit (F) or 60 degrees Celsius (C) using the test methods specified in *40 CFR 261.21*, and measured at the point of indirect discharge to the City's or the MWRA's sewerage system, or at such other place as the DPW or the MWRA determines; or

    (ii) Any pollutant, which causes an exceedance of 10 percent of the lower explosive limit as measured by an explosimeter at the point of discharge to the sanitary or combined sewer or at any point within the sanitary or combined sewer.

(e) Solids or viscous substances (such as, but not limited to, sand, mud, metal, glass, wood, paper, plastics, rags, improperly shredded garbage, rubber, latex, lime or other slurries, garbage, grease, animal guts or tissue, hides or fleshings, entrails bones, hair, feathers, ashes, cinders, stone or marble dust, straw, shavings, grass clippings, spent grains, spent hops, tar, asphalt residues, residues from refining or processing fuel or lubricating oil, grease, glass grinding or polishing wastes) in quantities or of such size as to be capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the City's wastewater system.

(f) Any noxious or malodorous liquids, gases or solids, which either singly or by interaction with other wastes, are capable of creating a public nuisance or hazard to life, or of preventing safe entry into sewers for purposes of inspection, maintenance repair, sampling, or any similar activity which results in the presence of toxic gases, vapors, or fumes within the wastewater system in a quantity that may cause acute worker health and safety problems.

(g) Any waters or wastes containing strong acid iron pickling wastes or concentrated plating solutions, whether neutralized or not.

(h) Any slug.

(i) Any Sludge, except from:

    (1) A water treatment plant owned and operated by the City, or by a water district created by special or general act of the Massachusetts Legislature, and when specifically permitted by the City and MWRA pursuant to 360 CMR 10.057; or

(2) A Reclaimed Water System, provided the Reclaimed Water Systems;
   (a) treats only Wastewater that does not require an active permit as described in 350 CMR 10.007(1)(a), (e), (f), (g), (h), or (i) for discharge into the City's and MWRA's Sewerage System;
   (b) has a Discharge into the City's sewer or combined sewer system;
   (c) has been issued a permit pursuant to 314 CMR 20.00: Reclaimed Water Permit Program and Standards; and
   (d) has been specifically permitted by the City and the MWRA pursuant to 360 CMR 10.051 through 10.056.

(j) Substances causing noticeable discoloration or turbidity.

(k) Liquids or vapors having a temperature higher than 150 degrees Fahrenheit (F) or 65 degrees Celsius (C), unless an alternative temperature limit is approved in writing by the DPW and the MWRA.

(l) Any garbage containing particles larger than one-half inches (1.27 centimeters) in any dimension or particles, which will not be carried freely in the wastewater system.

(m) Waters or wastes having pH lower than 5.5 or higher than 10.5, or having any other corrosive or injurious properties capable of causing damage or hazard to structures, equipment, people or the collection system. Excursions from these limits are permitted for facilities that continuously monitor pH, subject to limitations established by the MWRA in its *Sewer Use Regulations 360, CMR 10.000*.

(n) Mercury, polychlorinated biphenyls (PCBs), phenanthrene or pesticides, including but not limited to, dieldrin, chlordane, 1,1,1-Trichloro-2,2- bis(p-chlorophenyl)-ethane (4-4 DDT), demeton, endosulfan I, endosulfan II, endrin, guthion, heptachlor, malathion, methoxychlor, mirex, parathion, acrolein, aldrin, TDE, DDE, Hexachlorocyclo-hexane, lindane, benzene-cis-hexachloride and benzene-trans-hexachloride (BHC), hexachlorocyclopentadiene, hexachlorobutadiene and toxaphene.

(o) Waters or wastes containing amounts of metal or other materials in excess of the following limits as contained in federal, state or MWRA regulations:

MATERIAL	**DAILY AVERAGE LIMIT** milligrams per liter (mg/l)
Acrolein	0.15
Antimony (total)	10.0
Arsenic III (total)	0.5
Benzene	0.3
Cadmium (total)	0.1
Chromium (VI) (Hexavalent)	0.5
Chromium (total)	1.0
Copper (total)	1.0
Cyanide (total)	0.5
Formaldehyde	9.0
Hexachlorobutadiene	0.0
Lead (total)	0.2
Nickel (total)	1.0
Phenol	5.0
Selenium (total)	5.0
Silver (total)	2.0
Toxic Organic - each Toxic Organic not limited elsewhere in these Regulations or MWRA regulations	1.0
Toxic Organics (total)	5.0
Vinyl Chloride	0.02

Vinylidene Chloride 0.3
Zinc (total) 1.0

(p) Waters or wastes containing amounts of toxic or objectionable metals and nonmetals in excess of limits contained in federal, state or MWRA regulations or in a Sewer Use Discharge Permit.

(q) Radioactive wastes or isotopes of such half-life or concentrations as may exceed limits established by federal, state of MWRA regulations.

(r) Total suspended solids or dissolved solids of a type or concentration, which would inhibit flow in the collection system.

(s) Materials that exert a biochemical oxygen demand in excess of 400 milligrams per liter or a chemical oxygen demand in excess of 1,000 milligrams per liter or chlorine demand in excess of limits established by the MWRA.

(t) Waters or wastes containing fats, wax, oil and grease, in excess of 300 mg/l (based on the materials recovered in the applicable EPA approved procedure, unless otherwise authorized or required by the City and EPA), or containing any substance which may solidify or become viscous at temperatures between 32ºF (0ºC) and 180ºF (82ºC). Waters or wastes containing such substances, excluding normal household waste, shall exclude all visible floatable oils, fats and greases. The use of chemical, biological or physical means to bypass or release fats, waxes, oils or greases into the sewer is prohibited. If a person is unable to comply with the 300 mg/l requirement after treatment, the DPW may increase the limit on a case by case basis if the MWRA and DPW are satisfied that such increase will not contribute to nuisance conditions or an adverse impact on the wastewater system, receiving waters, or the MWRA's Wastewater Residuals program. The DPW may apply a monetary charge to any such increase in the limit to recover the costs it reasonably expects to incur as a result of the increase.

(u) Any substances containing pathogenic organisms in such quantities as determined by local, state or federal law as hazardous to the public health or the environment, including but not limited to any "Infectious or Physically Dangerous Medical or Biological Waste" as defined and identified by the Massachusetts Department of Public Health in its regulations entitled "Storage and Disposal of Infectious or Physically Dangerous Medical Waste or Biological Waste, State Sanitary Code, Chapter VIII," at *105 CMR 480.010*, and whose disposal via the municipal wastewater system or via a septic system is prohibited by *105 CMR 480.200*.

(v) Any hazardous waste, or any wastewater which results from the treatment of hazardous waste, and is discharged to the City's wastewater system by dedicated pipe, truck, rail, or by other method.

(w) Waste or wastewater discharged through a bypass, unless such discharge through the bypass was approved in writing in advance by the DPW and the MWRA, or the discharge through the bypass is allowed by *40 CFR 403.17* and the person using the bypass has provided the required notices to the DPW and the MWRA in a timely manner.

(x) Any filter backwash not specifically authorized to be discharged by a permit issued to the discharger by the DPW or the MWRA, any filter backwash that is not treated to meet the limits and prohibitions established by the DPW or the MWRA, or any filter backwash, which causes or contributes to a violation of these Regulations.

(y) Any trucked or hauled pollutants.

(z) Any water or wastewater, not otherwise governed by these Regulations, containing pollutants at levels which may adversely affect the MWRA's and the City's ability to process or dispose of its wastewater residuals in an environmentally sound and economic manner in accordance with

applicable state and federal requirements.

Section 3 - Prohibited Discharges into Sanitary Sewers.

(a) No person shall directly or indirectly discharge or cause or allow any stormwater to be discharged into any City sanitary sewer or any sanitary sewer tributary thereto.

(b) No person shall discharge or cause or allow to be discharged directly or indirectly into a City sanitary sewer or into a sanitary sewer tributary thereto any groundwater, dewatering drainage, subsurface drainage, accumulated surface water, non-contact cooling water, non-contact industrial process waters, uncontaminated contact cooling water, uncontaminated industrial process water, or waters associated with the excavation of a foundation or trench, hydrological testing, groundwater treatment/remediation, removal or installation of an underground storage tank or dewatering of a manhole, except as provided in Section 4 (b) below.

Section 4 - Prohibited Discharges into Combined Sewers. No person shall discharge or cause or allow to be discharged directly or indirectly into a City combined sewer or into a combined sewer tributary thereto any of the following:

(a) Groundwater, dewatering drainage, subsurface drainage, accumulated surface water, non-contact cooling water, non-contact industrial process waters, uncontaminated contact cooling water, uncontaminated industrial process water, or waters associated with the excavation of a foundation or trench, hydrological testing, groundwater treatment/remediation, removal or installation of an underground storage tank or dewatering of a manhole.

(b) Discharges otherwise prohibited by subsection (a) above may be permitted, when the discharger has taken all reasonable efforts to eliminate and minimize the flow, and there is no reasonable access to a stormwater drain, surface water, or another disposal alternative, and the amount to be discharged will not have an actual or potential adverse impact on the combined sewer system or the quality of receiving water, or the City's ability to meet its obligations under any law, regulation, permit, or order, and the discharger has obtained DPW Approval, subject to the following conditions:

    (1) A discharger shall obtain a Sewer Use Discharge Permit (which is issued jointly by the DPW and the MWRA) if applicable.

    (2) The DPW Approval and/or Sewer Use Discharge Permit may stipulate special conditions and terms as deemed necessary or appropriate by the DPW and/or the MWRA.

    (3) The DPW Approval and/or Sewer Use Discharge Permit shall be denied if the DPW determines that the discharge, whether singly or in combination with others, is or may cause or contribute to a water quality problem, or may cause or contribute to a violation of the City's NPDES Permit.

    (4) In the case of construction site dewatering, the duration of the DPW Approval and/or Sewer Use Discharge Permit shall not exceed the time period necessary to keep the site dewatered during construction.

    (5) A permittee may apply to the DPW and the MWRA for an extension of aDPW Approval or a Sewer Use Discharge Permit for construction site dewatering. Such application shall be submitted a minimum of fourteen (14) days prior to the expiration of the existing permit.

C. DISCHARGE PROHIBITIONS AND RESTRICTIONS APPLICABLE TO THE STORMWATER DRAINAGE SYSTEM.

Section 1 - Prohibited Discharges into Stormwater Drains. No person shall directly or indirectly

discharge or cause or allow to be discharged any Illicit Discharge or any other waters not composed entirely of stormwater into a building stormwater drain, lateral connection to a City stormwater drain or to a City stormwater drain except as provided in Sections 5 and 6 below.

Section 2 - Prohibited Connections to Stormwater Drains. The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

Section 3 – Wastewater System Connections. Any wastewater system which is or has been connected to the stormwater drainage system, or which is or has been connected to the stormwater drainage system as a result of a false application, misrepresentation, or non-disclosure on a construction permit, or which was connected to the stormwater drainage system by way of obtaining a wastewater system connection and plumbing permits through any means which circumvented the limitations created by this Article, shall be disconnected, from the stormwater drainage system by the Owner or by the City at the Owner's expense.

Section 4 – Flow Obstructions Prohibited.

(a) No person shall place any dam or other flow restricting structure or device in any drainage facility or watercourse without first having obtained a DPW Approval (Collection System Access) approval from the DPW.

(b) No person shall place or deposit into any outfall, drainage facility, stormwater drain or watercourse within the City any garbage, yard waste, soil, rock or similar material, or any other substance which obstructs flow in the stormwater drainage system or damages the system or interferes with the proper operation of the system or which constitutes a nuisance or a hazard to the public. In the event that such an obstruction occurs, the DPW may cause such obstruction to be removed or cause such damage to be repaired and to recover applicable costs pursuant to the provisions of Article VII of these Regulations.

Section 5 - Authorized Discharges to Stormwater Drains. Discharges to stormwater drains which are authorized by these Regulations are as follows:

(a) Discharges composed entirely of stormwater.

(b) Discharges for which the owner has obtained both a DPW Approval from the DPW and an NPDES Permit, coverage under an NPDES General Permit, or an NPDES Permit Exclusion from the EPA.

(c) The following categories of non-stormwater discharges are allowed provided the discharge meets the requirements of Article V. C. Section 5(d), and unless the City, EPA, or the MassDEP identifies any category or individual discharge as a significant contributor of pollutants to the MS4, at which time that category or individual discharge is not allowed and is to be considered an illicit discharge:

(i) water line flushing,

(ii) landscape irrigation,

(iii) diverted stream flows,

(iv) rising ground waters,

(v) uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)),

(vi) uncontaminated pumped ground water,

(vii) discharge from potable water sources,

(viii) foundation drains,

(ix) air conditioning condensation,

(x) irrigation water, springs,

(xi) water from crawl space pumps,

(xii) footing drains,

(xiii) lawn watering,

(xiv) individual resident car wash waters,

(xv) flows from riparian habitats and wetlands,

(xvi) dechlorinated swimming pool discharges,

(xvii) street wash water by methods approved by the City,

(xviii) residential building wash waters, without detergents, and

(xix) discharges or flows from emergency firefighting activities

(d) The DPW may restrict or prohibit the discharges in Article V, C, Section 5, (c) if such discharge may have an adverse effect on the capacity of the City's Stormwater Drain system to convey discharges composed entirely of stormwater. DPW may require these discharges to pass through an on-site infiltration system prior to discharge to the Stormwater Drain system. The design and maintenance of on-site infiltration system shall be subject to the approval of DPW and shall meet all current state and federal regulations. An on-site determination of the maximum seasonal groundwater elevation by a professional engineer or licensed soil evaluator must be included in the design. The design, installation and maintenance of the on-site infiltration system shall be at the Owner's expense. The on-site infiltration system must be maintained and remain operable at all times and may not be by-passed without written approval from DPW. Failure to maintain the infiltration system in operable condition shall be considered a violation of these Regulations and subject to enforcement under Article VII of these Regulations. The DPW shall have the right to inspect infiltration systems in accordance with this article and Article V, (A), § 3 of these Regulations.

Section 6 – Stormwater Discharges.

(a) With the exception of discharges authorized under Section 5 above, no person shall cause or allow any non-stormwater discharges to the City's stormwater drainage system without having first obtained a DPW Approval from the DPW. Discharges to stormwater drains that require a DPW Approval include, but are not limited to, dewatering drainage, subsurface drainage, non-contact cooling water, non-contact industrial process waters, uncontaminated cooling water, uncontaminated industrial process water, or water associated with the excavation of a foundation or trench, hydrological testing, groundwater treatment/remediation, removal or installation of an underground storage tank, foundation drains, crawl space pumps, footing drains or utility access chamber discharges The decision to issue a DPW Approval rests entirely with the DPW. Such discharges shall comply with all other applicable requirements.

(b) Persons seeking to discharge stormwater pursuant to a DPW Approval shall also obtain an NPDES Permit, coverage under an NPDES General Permit or an NPDES Exclusion for the discharge, where applicable, a copy of which shall be provided to the DPW.

(c) The DPW Approval issued to the user may stipulate special conditions and terms as deemed necessary or appropriate by the DPW.

(d) A DPW Approval shall be denied, revoked, suspended or reissued if the DPW determines that the discharge, whether singly or in combination with others, is or may cause or contribute to a water quality problem, or may cause or contribute to a violation of the City's NPDES Permit.

(e) In the case of construction site dewatering, the duration of the permit shall not exceed the time period necessary to keep a site dewatered during construction. A permittee may apply to the DPW for an extension of a DPW Approval for construction site dewatering if so approved by the appropriate state or federal agency. Such application shall be submitted to the DPW a minimum of fourteen 14 days prior to the expiration of the existing permit.

Section 7 - NPDES Notice of Intent and Permit. Every person who is required to be covered under an NPDES Permit for a Stormwater Discharge associated with Industrial Activity or for construction purposes shall submit to the City Engineer a copy of the completed Notice of Intent or individual application as submitted to EPA, and the information identified in items (a) through (h) below, as applicable:

(a) Address of the building (or premises) where the discharge will take place and the name and address of the building (or premises) owner;

(b) Name of a contact person, title and phone number;

(c) A site plan or sketch which shows the location of the connection of the building stormwater drain or the point(s) of discharge to the City's stormwater drainage system, including the street name, size of the stormwater drain to which the stormwater will discharge and the outfall to which the discharge will be conveyed and discharged;

(d) Standard Industrial Code (SIC Code) of the facility;

(e) A description of the product or services provided by the facility;

(f) A description of the nature of the discharge;

(g) Existing NPDES permit, if any;

(h) Facility's City water service account number.

D. OTHER DISCHARGE PROHIBITIONS AND RESTRICTIONS.

Section 1 - Dumping to Catch Basins. No person shall directly or indirectly dump, discharge or cause or allow to be discharged into any catch basin, any solid waste, construction debris, paint or painting product, antifreeze, hazardous waste, oil, gasoline, grease and all other automotive and petroleum products, solvents and degreasers, drain cleaners, commercial and household cleaners, soap, detergent, cleaning or wash waters ammonia, food and food waste, fats, wax, oil and grease, grass or yard waste, leaves, animal feces, dirt, sand, gravel or other pollutant. Any person determined by the City to be responsible for the direct or indirect discharge of any of the above substances to a catch basin may be responsible for all clean-up costs and for paying any penalties assessed by the City or other federal state or local agencies.

Section 2 - Disposal of Septage Prohibited. No person shall discharge or cause or allow to be discharged any septage into a City sanitary sewer, combined sewer, or stormwater drain or into any sewer or stormwater drain tributary thereto.

Section 3 - Notification of Spills

Notwithstanding other requirements of federal, state or local laws, rules or regulations, as soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the City's sanitary sewer, combined sewer, or stormwater drainage system or waters of the Commonwealth, the person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a release of oil or hazardous waste to the City's

sanitary sewer, combined sewer, or stormwater drainage system, the person shall immediately notify the City's fire, police, and public works departments. In the event of a release of a non-hazardous pollutant to the city's sanitary sewer, combined sewer, or stormwater drainage system, the reporting person shall notify the DPW within twenty-four (24) hours. The reporting person shall provide to the DPW written confirmation of all telephone, facsimile or in-person notifications within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained in accordance with the Massachusetts Public Records Law.

Article VI
Industrial Discharge and Pretreatment Requirements.

A. INDUSTRIAL DISCHARGE, MWRA GROUP PERMIT, MWRA GENERAL PERMIT AND TEMPORARY CONSTRUCTION SITE DEWATERING PERMIT REQUIREMENTS.

Section 1 - Compliance with MWRA Regulations. The intent of this Article is to comply with the MWRA regulations governing dischargers of industrial wastes. This Article shall accordingly be construed to conform with such MWRA regulations as they now exist or may be amended.

Section 2 - Prohibited Discharges. No industrial user shall discharge or cause or allowed to be discharged into any City sanitary or combined sewer or into any sanitary or combined sewer tributary thereto any prohibited or restricted wastes identified in Article V (B).

Section 3 - Discharge Permits.

(a) No user shall discharge industrial wastes, directly or indirectly, into the City's or MWRA's wastewater system without first obtaining a DPW Approval, and a Sewer Use Discharge Permit, or an MWRA Group Permit, or MWRA General Permit authorizing the discharge or unless such discharge is exempted by these Regulations. The determination as to whether a discharge constitutes an industrial discharge and that coverage under a DPW Approval and Sewer Use Discharge Permit, MWRA Group Permit, or MWRA General Permit is required rests with the DPW and the MWRA. Every user proposing a new or modified discharge of industrial wastes shall obtain the required permit(s) and shall file the required permit applications with the DPW prior to constructing a building sewer lateral or building combined sewer lateral to convey such wastes, or if a building sewer lateral or building combined sewer lateral already exists, prior to discharging to the City or MWRA wastewater systems. .

(b) A permittee shall provide at least 30 days advance written notification to the DPW and the MWRA before taking any action which may substantially change the volume or nature of its discharge, including a substantial change in the volume or character of pollutants in its discharge, from any compliance measurement locations, or from any wastewater connection. Such actions may include, but are not limited to, the following:

(i) substantial expansion or contraction of the facility for which the discharge originates;

(ii) substantial increase or decrease in production;

(iii) modification of any process;

(iv) alteration of the pretreatment system or the operation of the pretreatment system; or

(v) discharge from a different or relocated wastewater connection.

(c) The MWRA and DPW will review the information provided in the written notification of modification and will inform the permittee if the proposed change requires submission of a new permit application. The permittee shall file a new permit application if required by the DPW and/or the MWRA, and obtain a modified permit before taking the action described in the notice. If a new permit is not required, the permittee may take the action described in the notice, provided that the action does not violate these Regulations or the terms of any permit.

(d) If an industrial user discharges types, amounts or rates of pollutants in violation of these Regulations or its permit, the DPW may revoke its permit in accordance with Article VII, Section 5

of these Regulations. If changes in the industrial process have improved the characteristics and/or volume of its discharge, an industrial user may apply to the DPW and the MWRA for modification of its discharge permit.

(e) A permit shall not be assigned or transferred without prior written approval of the DPW and the MWRA. After approval of a permit assignment or transfer, the permittee shall provide a copy of the permit to the assignee or transferee.

Section 4 - Compliance With Discharge Permit. No user shall directly or indirectly discharge any industrial waste into the City's wastewater system unless such discharge complies with a DPW Approval and a Sewer Use Discharge Permit or an MWRA Group Permit, or an MWRA General Permit issued to the discharger, and complies with these Regulations.

Section 5 - Obligation to Comply With Regulations. The issuance of a DPW Approval and/or a Sewer Use Discharge Permit, an MWRA Group Permit, or MWRA General Permit shall not relieve the permittee of its obligation to comply with the *Massachusetts Clean Waters Act, M.G.L., c. 21, sections 26 through 53*, and with the requirements contained in these Regulations, and all other applicable federal, state and local laws and regulations.

Section 6 - Significant Industrial Users. In addition to the requirements of these Regulations, any person operating a facility in Cambridge that is a significant industrial user as defined in *40 CFR 403.3* shall comply with the applicable requirements of *40 CFR Part 403*, including the reporting requirements of *40 CFR 403.12* and any *National Categorical Pretreatment Standard* applicable to the facility, and all other applicable federal, state and local laws and regulations.

Section 7 - Sewer Use Discharge Permit Application and Issuance.

(a) Every User required to obtain a Sewer Use Discharge Permit shall complete and file with both the DPW and the MWRA a permit application form, which may be obtained from the MWRA.

(b) The DPW and the MWRA shall evaluate the adequacy of data furnished in the application and may require the applicant to provide additional data within a specified time. If the applicant fails to supply the requested information, the DPW and/or the MWRA may deny the Sewer Use Discharge Permit. After receipt of adequate data, the DPW and the MWRA may issue a Sewer Use Discharge Permit. The Sewer Use Discharge Permit is effective only when authorized in writing by both the DPW and the MWRA.

(c) The DPW and the MWRA may stipulate special conditions and terms, as authorized by law, upon which a Sewer Use Discharge Permit is issued, including but not limited to the following:

(i) Limits on rate, time and characteristics of discharge and requirements for flow regulation, equalization and retention.

(ii) Installation of inspection, flow measurement and sampling facilities, and provision for access to such facilities for inspection and/or sampling related to the permit terms and conditions.

(iii) Specifications for monitoring programs, which may include flow measurement, sampling, physical, chemical and biological tests, data recording, and reporting schedules.

(iv) Pretreatment requirements and implementation schedules, including schedules for reporting progress towards meeting such requirements.

(v) Periodic submission of discharge reports and retention and submission of hazardous waste manifests.

(vi) Special service charges or fees.

(vii) Provision for the operation of wastewater pretreatment facilities by persons licensed according to State law, including the *Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities, 257 CMR 2.00*.

(viii) Other provisions deemed appropriate by the DPW or the MWRA to ensure compliance with these Regulations, and with applicable requirements of State or Federal laws.

(d) The DPW or the MWRA may change the conditions of a Sewer Use Discharge Permit from time to time as circumstances (including federal or state laws, rules or regulations) may require.

Section 8 - MWRA Group Permit Application. The Owner of a facility required to be covered under an MWRA Group Permit shall complete and file with the MWRA an application or Notice of Intent to Discharge, on a form available from the MWRA. A copy of the application or the Notice of Intent shall be provided to the DPW. The Owner shall not commence discharging until it is issued a Group Permit by the MWRA, and a copy of the Group Permit is filed with DPW.

Section 9 - MWRA General Permit Application. The Owner of a facility required to be covered under an MWRA General Permit shall complete and file with the MWRA an application or Notice of Intent to Discharge, on a form available from the MWRA. A copy of the application or the Notice of Intent shall be provided to the DPW. The Owner shall not commence discharging until it receives written notice from MWRA that the facility is covered under a General Permit, and a copy of the General Permit is filed with DPW.

Section 10 – Temporary Construction Site Dewatering Permit Application. The Owner of a facility required to be covered under a DPW Approval for temporary construction site dewatering shall complete and file with the MWRA or EPA an application or Notice of Intent (NOI) to Discharge, on a form available from the MWRA or EPA in accordance with their requirements. A completed application for temporary construction site dewatering and a copy of the approved MWRA Construction Site Dewatering Permit or EPA's NPDES General Permit for Construction Dewatering shall be provided to the DPW. The Owner shall not commence discharging until it is issued a DPW Approval for temporary construction site dewatering. If a discharge is conveyed to a wastewater system, the discharge shall be metered and the sewer charge will be applied by the DPW and is the responsibility of the permittee.

Section 11 - Notification to Employees. Users shall inform their employees of the existence of these Regulations, and if applicable, of the permittee's DPW Approval, and/or Sewer Use Discharge Permit, MWRA Group Permit, or MWRA General Permit. At least one copy of these Regulations and the permit(s) shall be permanently and conspicuously posted by each such User. Such User shall also permanently post a notice identifying the employee who has been designated as the individual responsible for compliance with, and who should be notified of, any violation of these Regulations or permit. Every such User shall provide copies of the above-referenced permits to each employee working in its pretreatment operations.

B. PRETREATMENT REQUIREMENTS.

Section 1 - Pretreatment Requirements. Every User who directly or indirectly discharges wastewater to the City or the MWRA wastewater system shall provide the pretreatment necessary to ensure that the discharge complies with these Regulations. All pretreatment equipment shall be properly installed and maintained in satisfactory and effective operation at the Owner's expense.

Section 2 - Compliance with the Pretreatment Standards. Every User whose operation within Cambridge is subject to a *National Categorical Pretreatment Standard* shall obtain a Sewer Use Discharge Permit for this operation.

Section 3 - Pretreatment Regulations. All industrial Users and dischargers of industrial wastes shall

comply with federal, state, and local laws, rules and regulations pertaining to industrial pretreatment as they now exist or may be amended in the future.

Section 4 - Pretreatment Facilities.

(a) Prior to construction or installation of any pretreatment facilities required by any applicable industrial pretreatment federal, state and local laws, rules and regulations, detailed plans and operating procedures, along with a proposed implementation schedule, shall be submitted to the DPW and the MWRA for review. The review of such plans and operating procedures will in no way relieve such User from the responsibility of modifying the pretreatment facility as may be necessary to produce an effluent acceptable to the DPW and the MWRA under the provisions of their respective regulations and the requirements of federal, state or local agencies.

(b) An approved implementation schedule will be incorporated in the Sewer Use Discharge Permit. Any subsequent proposed changes in a pretreatment facility or method of operation shall be reported to and approved by the DPW and the MWRA before modification of such a facility.

(c) Pretreatment facilities shall be continuously maintained in satisfactory and effective operation. All costs associated with pretreatment facility planning, design, construction, operation and maintenance shall be borne by the Owner or User. The DPW shall have the right to inspect such facilities in accordance with Article V, Section 3 of these Regulations.

Section 5 - Pretreatment Operator's License. The individual(s) responsible for operating a pretreatment system that discharges directly or indirectly to the DPW's wastewater system shall possess the proper operator's license(s) as required by law, including the *Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities, 257 CMR 2.00.*

Article VII
Violations, Penalties and Enforcement

Section 1 - Violations.

Any person who fails to comply with the requirements of these Regulations or the terms and conditions of any permit issued thereunder or the requirements of any federal, state or local laws, rules or regulations governing use of the City's wastewater and stormwater drainage system shall be subject to enforcement actions by the DPW.

(a) Each day a violation occurs or continues shall be considered a separate violation.

(b) For violations of discharge limits, each parameter that exceeds a discharge limit shall be considered a separate violation except as provided elsewhere in these Regulations adopted hereunder.

Section 2 - Administrative Orders.

The DPW may issue the following administrative orders at any time it deems such action appropriate to address violations of or to secure timely and effective compliance with these Regulations or the terms and conditions of any permit issued thereunder or the requirements of any federal, state or local laws, rules or regulations governing use of the City's wastewater and stormwater drainage system, whether or not any previous notifications of violation have been provided to the User.

(a) Cease and Desist Order. The DPW may issue an order to cease and desist a violation or an action or inaction which threatens a violation and to direct the user to comply forthwith or to take such appropriate remedial or preventive action as may be needed to properly address the violation or threatened violation, including halting operations and terminating the discharge.

(b) Compliance Order. The DPW may issue an order requiring a User to provide within a specified period of time, such treatment, pretreatment or discharge control facilities or related appurtenances as are necessary to correct a violation or to prevent a threatened violation. A compliance order may also direct that a User provide improved operation and maintenance of existing discharge facilities, conduct additional self-monitoring or submit appropriate reports or operation and maintenance logs.

(c) Show Cause Order. The DPW may issue an order to show cause why a proposed enforcement action should not be taken. Notice shall be served on the User specifying the time and place for a meeting, the proposed enforcement action and the reasons for such action, and a request that the User show cause why the proposed enforcement action should not be taken. Whether or not a duly notified User appears as noticed, additional enforcement action may be initiated.

(d) Consent Order. The DPW may enter into consent orders, assurances of voluntary compliance, or other similar documents establishing an agreement with a User. Such orders shall include specific actions to be taken by the User and specific time frames to correct a violation or to remove the threat of a violation. Consent orders are allowed when:

(i) User agrees to return to compliance promptly, and remedy any adverse impacts of noncompliance within a reasonable period of time; and

(ii) Noncompliance has not caused actual harm to public health, safety or welfare, or the environment, or otherwise presented a significant threat; and

(iii) Noncompliance does not involve criminal conduct; and

(iv) User demonstrates a good faith intention to maintain future compliance with all applicable environmental requirements; and

(v) Where applicable, User agrees to investigate pollution prevention, source reduction and resource conservation opportunities, and implement them, as established to be feasible by the User and agreed to by DPW.

Section 3 – Emergency Action.

When a User has failed to take action within the time established in an administrative notice or order to eliminate an imminent threat to humans or to the environment or to the effective operation of the City's collection system, the DPW may take such action as deemed necessary, including work by City personnel to eliminate the threat or to mitigate the impact on the City's collection system or the environment. The DPW shall attempt to notify the User of the intended action, but if unable to do so within a reasonable period of time, shall proceed with the action.

Section 4 - Penalties.

(a) Criminal Penalty Any person who shall continue any violation beyond the time limit provided for, shall be guilty of a misdemeanor, and on conviction thereof, shall be fined in the amount not exceeding five thousand dollars ($5,000.00) for each violation. Each day in which any such violation continues shall be deemed a separate offense. Failure to pay a civil penalty within 30 days following a final determination regarding the violation is grounds for termination of the Owner's discharge as outlined in Section 5.

(b) Civil Penalty Authorized enforcement personnel may issue citations, pursuant to G.L., c. 40, § 21D, for violations of these provisions assessing fines of up to five thousand dollars ($5,000.00) for each day such violation is committed or permitted to continue.

(c) Injunction As an additional remedy a violation of these Regulations may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

Section 5 - Termination or Prevention of a Discharge.

(a) Notwithstanding any other provision of these Regulations, the DPW may terminate or prevent a discharge into the City's sanitary or combined system or to the City's stormwater drainage systems if:

(i) the discharge or threatened discharge presents or may present an endangerment to human health or the environment, or threatens to interfere with the operation of the City's collection system; or

(ii) a permit was obtained by misrepresentation of any material fact or lack of full disclosure; or

(iii) the discharger violates any requirement of these Regulations or the terms and conditions of any permit issued thereunder or the requirements of any federal, state or local laws, rules or regulations governing use of the City's wastewater and stormwater drainage system; or

(iv) Such action is directed by a court of competent jurisdiction.

(b) Notice of termination or prevention of discharge or permit revocation shall be provided to the discharger or posted on the subject property prior to terminating or preventing discharge.

(i) In situations that do not represent an imminent danger to human health or the environment or an imminent threat of interference to the City's sanitary or combined system or to the City's stormwater drainage systems, the notice shall be in writing, shall contain the reasons for the termination or prevention of discharge, the effective date, duration and the name, address and telephone number of a City contact, shall be signed by the Commissioner of Public Works, and shall be received at the business address of the discharger no fewer than 30 days prior to the effective date.

(ii) In situations where there is an imminent endangerment to human health or the environment or imminent threat of interference with the operations of the City's sanitary or combined system or to the City's stormwater drainage systems, the DPW may immediately terminate an existing discharge or prevent a new discharge from commencing after providing informal notice to the discharger or after posting such notice on the subject property. Informal notice may be verbal or written and shall include the effective date and time and a brief description of the reason. Within 3 working days following the informal notice, a written formal notice containing the reasons for the termination or prevention of discharge, the effective date, duration and the name, address and telephone number of the City contact, signed by the Commissioner of Public Works, and shall be provided to the discharger.

(c) The DPW shall reinstate discharge privileges upon clear and convincing proof by the discharger of the elimination of the noncomplying discharge or conditions creating the threat of endangerment or interference as set forth in these Regulations.

Section 6 – Cost Recovery

(a) The DPW may recover all reasonable costs incurred by the City which are attributable to or associated with violations of these Regulations, including but not limited to the costs of administration, investigation, sampling and monitoring, legal and enforcement activities, damage to the City's sanitary or combined system or to the City's stormwater drainage systems, contracts and health studies, and any fines and penalties assessed to the City which result from a discharge not in compliance with these Regulations or rules adopted thereunder.

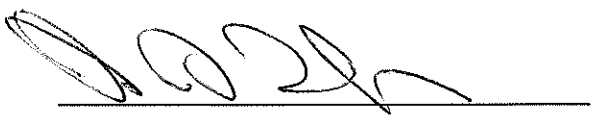
(b) All such costs shall be documented by the City and shall be served upon the discharger by certified or registered mail, return receipt requested. Such documentation shall itemize the costs the DPW has determined are attributable to the violations.

(c) Such costs are due and payable to the City upon the receipt of the letter documenting such costs. All such costs shall be paid to the City Treasurer. Nonpayment or dispute regarding the amount shall be referred for appropriate action to the City Solicitor. The City Solicitor may initiate appropriate action against the discharger to recover costs under this Article.

(d) The DPW may terminate a discharge for nonpayment of costs after 30 days notice to the discharger.

Adopted:

Effective Date: June 30, 2021



Owen O'Riordan

Commissioner

APPENDIX B

Storm System Mapping

City of Cambridge Stormwater Catchment Areas and Outfalls

06/30/2026

Catchment Areas

Combined

D01 - CAM017
D03 - Prison Point
D03A - Prison Point
D17 - Cottage Farm
D20 - Cottage Farm
D22 - CAM011
D24 - Cottage Farm
D26 - CAM009
D29 - CAM007
D32 - CAM005
D37 - CAM401A
D39 - MWR003/CAM401A
D41 - CAM002
D43 - CAM001

Separated

D02 - Lechmere Canal
D02A - Lechmere Canal
D02B - Lechmere Canal
D02C - Lechmere Canal
D02D - Lechmere Canal
D02E - Lechmere Canal
D02F - Lechmere Canal
D03B - Museum Way
D03C - North Point
D03E - Lechmere Canal
D04 - Main St
D05 - Wadsworth St
D06 - Ames St
D07 - Broad Canal
D08 - Mass Ave at Memorial Dr
D09 - Danforth St
D10 - Endicott St
D11 - Amesbury St
D11B - Audrey St
D12 - Talbot St
D13 - MOB Highway to Lechmere Canal
D15 - Pearl St
D16 - Pleasant St
D17A - Western Ave
D18 - Hingham St
D19 - Flagg St
D21- Dewolfe St
D25 - JFK West
D27 - University Rd
D28 - Brewer St
D30 - Willard
D31- Spark St
D33 - Blanchard Rd at Wellinton Brook
D33A - Blanchard Rd
D34 - Normandy Terr
D36 - Stormwater Wetland
D36R_2/3/4 - Local Drainage (Fresh Pond)
D38 - North of Cambridgepark Dr
D40 - Harrison Ave
D44 - Matignon Rd
D46 - Acorn Park Dr
D50 - Cemetery Drainage 237
D52_1/2/3/4/5 - Russel Field
D53 - Binney St
D55 - River St
D56 - Cemetery Drainage 104
IC-1 - Shady Hill School
IC-23 - JFK East
IC-51A - West Kendall St
IC-51B - East Kendall St

Outfalls

- Active Combined Sewer Overflow (CSO) Outfalls
- Inactive CSO Outfalls
- Stormwater Outfall
- Incoming Interconnection Belmont
- Incoming Interconnection Other
- Outgoing Interconnection
- Water Segment Divide
- Watershed Divide
- Wetlands

Catchments

- MS4 Stormwater Catchments
- Combined Sewer Catchments
- Non-MS4 or Non-Cambridge Stormwater Catchments

Little River (MA71-21)

Impairments:	Monitoring Requirements:
(Debris*)	No Monitoring Requirements
(Water Chestnut*)	No Monitoring Requirements
Chloride	No Monitoring Requirements
Copper in Sediment	Copper, Total
DO	Dissolved Oxygen, Temperature, BOD5, Total Phosphorus
E. coli	E. coli
Enterococcus	Enterococcus
Flocculant Masses	Contact MassDEP
Lead in Sediment	Lead, Total
Odor	No Monitoring Requirements
Oil and Grease	Oil and Grease
PCBs in Fish Tissue	No Monitoring Requirements
Total Phosphorus	Total Phosphorus
Scum/Foam	Contact MassDEP
Transpancy/Clarity	Total Suspended Solids
Trash	No Monitoring Requirements

*TMDL Not Required (Non-Pollutant)

Little River (MA71-22)

Impairments:	Monitoring Requirements:
(Debris*)	No Monitoring Requirements
Copper in Sediment	Copper, Total
DO	Dissolved Oxygen, Temperature, BOD5, Total Phosphorus
E. coli	E. coli
Flocculant Masses	Contact MassDEP
Lead in Sediment	Lead, Total
Odor	No Monitoring Requirements
Oil and Grease	Oil and Grease
PCBs in Fish Tissue	No Monitoring Requirements
Total Phosphorus	Total Phosphorus
Scum/Foam	Contact MassDEP
Transparency/Clarity	Total Suspended Solids
Trash	No Monitoring Requirements

*TMDL Not Required (Non-Pollutant)

Alewife Brook (Segment MA71-20)

Impairments:	Monitoring Requirements:
(Debris*)	No Monitoring Requirements
(Water Chestnut*)	No Monitoring Requirements
Chloride	Chloride
Copper in Sediment	Copper, Total
DO	Dissolved Oxygen, Temperature, BOD5, Total Phosphorus
E. coli	E. coli
Enterococcus	Enterococcus
Flocculant Masses	Contact MassDEP
Lead in Sediment	Lead, Total
Odor	No Monitoring Requirements
Oil and Grease	Oil and Grease
PCBs in Fish Tissue	No Monitoring Requirements
Total Phosphorus	Total Phosphorus
Scum/Foam	Contact MassDEP
Sediment Bioassays -- Chronic Toxicity Freshwater	Contact MassDEP
Transpancy/Clarity	Total Suspended Solids
Trash	No Monitoring Requirements

*TMDL Not Required (Non-Pollutant)

Blacks Nook (Segment MA71005)

Impairments:	Monitoring Requirements:
(Water Chestnut*)	No Monitoring Requirements
Nutrient/Eutrophication-Biological Indicators	Total Phosphorus
Transparency/Clarity	Total Suspended Solids

*TMDL Not Required (Non-Pollutant)

Charles River (Segment MA72-38)

Impairments:	Monitoring Requirements:
(Fish passage barrier*)	No Monitoring Requirements
(Flow regime modification*)	No Monitoring Requirements
Cause Unknown--	Contact MassDEP
(Sediment Screening Value Exceedance) Chlorophyll-a	
Combined Biota/Habitat-- Bioassessments	Total Phosphorus Contact MassDEP
DO and DO Supersaturation	
DDT in Fish Tissue	Dissolved Oxygen, Temperature, BOD5, Total Phosphorus
E. coli	No Monitoring Requirements
Harmful Algal Blooms	E. coli
Nutrient/Eutrophication -- Biological Indicators	Total Phosphorus Total Phosphorus
Odor	
Oil and Grease	No Monitoring Requirements
PCBs in Fish Tissue	Oil and Grease
Salinity	No Monitoring Requirements
Total Phosphorus	Specific Conductance
Temperature	Total Phosphorus
Transparency/Clarity	No Monitoring Requirements Total Suspended Solids

*TMDL Not Required (Non-Pollutant)

Charles River (Segment MA72-36)

Impairments:	Monitoring Requirements:
(Fish-Passage Barrier*)	No Monitoring Requirements
(Flow Regime modification*)	No Monitoring Requirements
(Non-Native Fish/Shellfish/Zooplankton*)	No Monitoring Requirements
(Water Chestnut)	No Monitoring Requirements
Chlorophyll-a	Total Phosphorus
Dissolved Oxygen (DO)	Dissolved Oxygen, Temperature, BOD5, Total Phosphorus
DDT in Fish Tissue	No Monitoring Requirements
E. coli	E. coli
Fish Bioassessments	Contact MassDEP
Harmful Algal Blooms	Total Phosphorus
Nutrient/Eutrophication Biological Indicators	Total Phosphorus
Oil and Grease	Oil and Grease
PCBs in Fish Tissue	No Monitoring Requirements
High pH	pH
Total Phosphorus	Total Phosphorus
Sediment Bioassays --	Contact MassDEP
Acute Toxicity Freshwater	Toxicity Freshwater
Transparency/Clarity	Total Suspended Solids
Unspecified Metals in Sediment	Contact MassDEP

*TMDL Not Required (Non-Pollutant)

Millers River (Segment MA72-31)

Impairments:	Monitoring Requirements:
(Bottom Deposits*)	Total Suspended Solids
(Debris*)	No Monitoring Requirements
(Habitat Assessment*)	Contact MassDEP
Flocculant Masses	Contact MassDEP
Odor	No Monitoring Requirements
Oil and Grease	Oil and Grease
Petroleum Hydrocarbons	Oil and Grease
Polychlorinated Biphenyls (PCBs)	No Monitoring Requirements
Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems)	PAHs
Scum/Foam	Contact MassDEP
Sedimentation/Siltation	Total Suspended Solids
Turbidity	Turbidity
Trash	No Monitoring Requirements
Unspecified Metals in Sediment	Contact MassDEP

*TMDL Not Required (Non-Pollutant)

LECHMERE CANAL:

APPENDIX C

SSO Inventory

SSO Notification Form

Massachusetts Department of Environmental Protection
Bureau of Water Protection – Wastewater Management Program

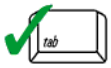
Sanitary Sewer Overflow (SSO)/Bypass Notification Form

FOR DEP USE ONLY

Tax Identification Number

A. Reporting Facility

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Facility Information

Reporting Sewer Authority _____ Permit # _____

2. Authorized Representative Transmitting Form:

First Name _____ Last Name _____ Telephone No. _____

Title _____ E-mail Address _____

B. Phone Notifications:

See DEP Regional Office telephone and fax numbers at the end of this form.

1. **MassDEP staff** contacted: first name _____ last name _____

   Date/Time contacted: Date _____ Time _____ ☐ am ☐ pm

2. **EPA staff** contacted: first name _____ last name _____

   Date/Time EPA contacted: Date _____ Time _____ ☐ am ☐ pm

3. Board of Health contacted: First Name _____ Last Name _____

   Date/Time contacted: Date _____ Time _____ ☐ am ☐ pm

4. Others notified (select all that apply); ☐ Conservation Commission

   ☐ Harbormaster ☐ Shellfish Warden ☐ Division of Marine Fisheries

   ☐ Downstream Drinking Water Supplier ☐ Watershed Association

   ☐ Beach Resource Manager ☐ Other: _____ (specify)

C. SSO Information

1. SSO Discovered: Date _____ Time _____ ☐ am ☐ pm

   By: _____

2. SSO Stopped: Date _____ Time _____ ☐ am ☐ pm

3. SSO Discharge from: ☐ Sanitary Sewer Manhole ☐ Pump Station

   ☐ Backup into Property ☐ Other: _____ (specify)

4. SSO Discharge to: ☐ Ground Surface (no release to surface water)

   ☐ Direct to Receiving Water _____ (surface water)

   ☐ Catch basin to Receiving Water _____ (surface water)

   ☐ Backup into Property Basement

Massachusetts Department of Environmental Protection
Bureau of Water Protection – Wastewater Management Program

Sanitary Sewer Overflow (SSO)/Bypass Notification Form

FOR DEP USE ONLY

Tax Identification Number

C. SSO Information (cont.)

Location: _____
(Description of discharge site or closest address)

5. Estimated SSO Volume at time of this Report: _____

   Method of Estimating Volume: _____

6. Cause of SSO Event:

   ☐ Rain Event ☐ Pump Station Failure ☐ Insufficient Capacity in System

   ☐ Treatment Unit failure

   ☐ Sewer System Blockage: ☐ Pipe Collapse ☐ Root Intrusion ☐ Grease Blockage

   ☐ Other: _____
   (Specify)

7. Corrective Actions Taken:

Impact Area cleaned and/or disinfected: ☐ Yes ☐ No

Corrective Actions Completed: ☐ Yes ☐ No

D. Comments/Attachments/Follow-up

I wish to provide (select all that apply):

☐ Attachment ☐ Additional comments below: ☐ No additional comments or attachments

Additional comments and planned actions:

Massachusetts Department of Environmental Protection
Bureau of Water Protection – Wastewater Management Program

Sanitary Sewer Overflow (SSO)/Bypass Notification Form

FOR DEP USE ONLY

Tax Identification Number

E. Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative

Date Signed

Please keep a copy of this report for your records. When submitting additional information, include the MassDEP Incident Number from this report.

MassDEP Regional Office and EPA Telephone and Fax Numbers:

Northeast Region	Phone: 978-694-3215	Fax: 978-694-3499
Southeast Region	Phone: 508-946-2750	Fax: 508-947-6557
Central Region	Phone: 508-792-7650	Fax: 508-792-7621
Western Region	Phone: 413-784-1100	Fax: 413-784-1149
EPA	Phone: 617-918-1510	
EPA for Southeast Region, David Turin	Phone: 617-918-1598	Fax: 617-918-0598
EPA for Northeast, Central and Western Regions, Douglas Koopman	Phone: 617-918-1747	Fax: 617-918-0747
DEP 24-hour emergency	Phone: 888-304-1133	

City of Cambridge, MA
MCM 3 - ILLICIT DISCHARGE DETECTION & ELIMINATION
Sanitary Sewer Overflow (SSO) Inventory

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
2026 Reported SSOs								
Loading dock across from 1691 Cambridge St	SSO into loading dock area from sanitary sewer manhole	1/30/2026	8:45 AM	10:30 AM	100 gallons	Sewer backed up into the loading dock area as a result of grease from the interceptor.	Cambridge Public School's contractor identified and removed the grease blockage. DPW's contractor cleaned the grease interceptor.	DPW advised that the interceptor be checked weekly for freezing or clogging at the outlet.
6 Bennett St	SSO in Basement	1/12/2026	4:30 PM	9:00 PM	100 Gallons	Sewer backed up into basement due to blockage in sewer line on Bennett St.	DPW crews jetted the sewer line to clear the blockage. DPW's contractor completed CCTV of the sewer line and observed a sag downstream.	DPW will perform weekly maintenance on sewer pipe until the sag can be corrected.
675 Concord Ave	SSO into street from sanitary sewer manhole	1/2/2026	1:00 PM	2:00 PM	200 gallons	Sewer backed up into street as a result of privately operated sewer holding tank which overflowed.	DPW pumped out sewer manhole and jetted the City's sewer main. City also advised property manager of responsibilities to maintain sewer holding tank.	
2025 Reported SSOs								
238 Main Street	SSO in basement from pump station failure.	5/12/2025	12:30 AM	5:00 AM	Unknown	Sewer backed up into basement at 238 Main Street due to pump station failure.	DPW manually turn on the pumps in the pump station at 5:00AM.	DPW called in the pump station maintenance contractor to check all pump station controls.
2024 Reported SSOs								
678 Massachusetts Ave	SSO in Basement	12/17/2024	1:00 PM	5:30 PM	Unknown	Cambridge DPW received a report from the building manager of 678 Mass Ave on Dec 17 at 1:00 PM that there was water in the basement coming from a sewer pipe.	DPW sewer crews jetted the line from Western Ave to past 678 Mass Ave and vacuumed the manhole in front of 678 Mass Ave.	DPW will schedule cleaning with City's TV and Cleaning contractor.
19 Blackstone St	SSO in Basement	12/11/2024	2:00 PM	6:00 PM	Unknown	Cambridge DPW received a report of a backed up sewer at 19 Blackstone St during a rain storm.	DPW sewer crews jetted Blackstone St on Dec 11, 2024 and removed the blockage. DPW's TV and cleaning contractor removed debris, rocks and gravel from the pipe on Dec 13, 2024.	
25, 31, 32 and 36 Loomis St	SSO in Basement	12/3/2024	7:00 AM	12:00 PM	Unknown, over 100 gallons	Cambridge DPW received a report of backed up sewer on Loomis St that was the result of a collapsed sewer pipe.	DPW set up a bypass pump on Loomis St. DPW excavated and repaired the collapsed sewer pipe.	Additional sewer rehabilitation is planned for Loomis St.
323 Columbia St	SSO in Basement	2/23/2024	1:00 PM	2:30 PM	Unknown	Cambridge DPW received a report from the building manager of 323 Columbia St on Feb 23 at 1:30 PM that there was water in the basement coming from a sewer pipe.	A collapsed section of pipe on Hampshire St was discovered to be the cause of the backup. The City's Remedial Repair contractor excavated and repaired the collapsed pipe.	

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
149 Alewife Brook Pkwy	SSO in Parking Lot	11/9/2023	9:00 AM	10:00 AM	Unknown	Sewer overflow from privately owned sewer manhole in parking lot at 149 Alewife Brook Pkwy	DPW vactored out the privately owed manhole and a catch basin. A contractor hired by the facility jetted the line and vacuumed the manhole the afternoon of Nov 9, 2023.	DPW will monitor the parking lot and will require the facility to have a contractor perform a video inspection of the private sewer service line
2348 - 2350 Mass Ave	SSO in Basement	9/16/2023	5:00 PM	9:00 PM	Unknown	Cambridge DPW received a report of a backed up sewer at 2348-2350 Mass Ave on Sept 16, 2023.	DPW sewer crews jetted the Mass Ave sewer line on Sept 16 and again on Sept 18, 2023.	DPW will add the sewer manhole at Mass Ave and Norris St to the list of locations for monthly inspections. DPW will also have the City's TV contractor inspect the sewer line
20 Corporal McTernan St	SSO in Basement	9/21/2023	5:00 PM	6:00 PM	Unknown	Cambridge DPW received a report of a backed up sewer at 20 Corporal McTernan St on Sept 21, 2023.	DPW sewer crews jetted the Corporal McTernan St sewer line.	DPW will add the Corporal McTernan St sewer to the list of manhole locations that are routinely inspected.
2023 Reported SSOs								
362-364 Rindge Ave.	SSO in Parking Lot	4/20/2023	1:00AM	4:00AM	5,000 gallons	Surcharging MH with signs of heavy grease within parking lot.	Sewer line was jetted and blockage was freed.	
256 Putnam Ave	SSO in Basement	3/15/2023	3:30PM	not reported	Unknown	Cambridge DPW received a report of a backed up sewer at 256 Putnam Ave. following a heavy rainstorm.	Crews jetted the putnam Ave combined sewer line and cleared a blockage. DPW visited site on March 18 provided information to resident.	
2022 Reported SSOs								
358 Huron Ave.	SSO in Basement	9/23/2022	8:30AM	11:00AM	Unknown	Sewer Division observed high water in manholes on Gurney St.	DPW Jetted the line with vactor truck and removed debris and gravel from line. Line was televised and cleared.	
397 Norfolk Street	SSO in Basement	8/26/2022	1:30PM	7:00PM	Unknown	Cambridge DPW observed high water in sewer manholes on Norfolk St.	Sewer was jetted and blockage was removed.	
3 Davenport Street	SSO in Basement	5/10/2022	4:00 PM	6:45 PM	Unknown	Cambridge DPW Sewer Division crews checked sewer manholes on Davenport St and observed high water in a dead end manhole	DPW Sewer Division crews jetted the Davenport St Sewer line with vactor truck and cleared a blockage.	Cambridge DPW will clean and TV of Davenport St sewer. Cambridge DPW Sewer Crew will check and jet the Davenport St sewer line on a frequent basis.

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
15 Dunster St	SSO in basement	5/3/2022	1:15 PM	2:30 PM	Unknown	Cambridge DPW Sewer Division crews checked sewer manholes on Dunster St and observed high water. DPW Jetted the Dunster St sewer line with vactor truck and cleared the blockage.	DPW Sewer Division crews jetted the Dunster St sewer line with vactor truck and cleared a blockage.	Cambridge DPW will schedule cleaning and TV of Dunster St sewer with the City's TV and Cleaning contractor.
2021 Reported SSOs								
362-364 Rindge Ave	SSO discharge from private property parking lot	12/12/2021	2:45 PM	4:45 PM	5,000 Gallons	DPW Sewer Division observed a manhole surcharged with signs of heavy grease within the parking lot of the apartment complex.	DPW jetted the sewer line from a downstream manhole in the parking lot and freed the blockage. SSO overflow was confined to the parking lot. There were no problems with the City's sewer line and no overflow to any City storm drains.	
4-6 Crawford Street	SSO from mixed groundwater in basement	10/14/2021	8:30 AM	1:00 PM	Unknown	DPW observed water running down the street from a hose on 10/14/21 at 8:30 AM and again on 10/18 due to rainstorms and blocked sewer and may have leaked and mixed with groundwater.	DPW pumped out a catch basin Broadway where the discharge collected. The Broadway storm drain connects to combined Sewer	
2020 Reported SSOs								
Water Street	SSO discharge to ground surface (no release to surface water)	3/31/2021	12:00 PM	2:15 PM	50 Gallons	Sewer system blockage. Several sewer manhole surcarged and manhole full of grease.	DPW pumped out the manhole with grease and the TV and Cleaning contractor jetted the sewer line to free the blockage. DPW also pumped water out of the catch basins on Water St (which go to a combined sewer)	DPW will schedule additional jetting and TV inspection of the section of sewer line that was blocked. DPW will add the manhole that was full of grease to a list of locations that are routinely inspected on a monthly basis.
362-364 Rindge Ave	SSO discharge to ground surface (no release to surface water)	3/30/2021	5:15 PM	7:15 PM	5,000 Gallons	Sewer system blockage with overflow into parking lot. Heavy grease observed in manhole	DPW jetted the sewer line from a downstream manhole within the parking lot and freed the blockage. Blockage and overflow confined to parking lot.	DPW spoke to property manager about maintaining sewer lines and a list of sewer/drain cleaning contractors for any future issues
168 Western Ave	SSO discharge into private property basement and catch basin to receiving water.	11/20/2020	7:00 PM	11:00 PM	100 Gallons	Sewer pipe in building was blocked and sewage from building overflowed into basement and exterior of building	DPW pumped out two nearby catch basins on Western Ave.	

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
907 Main St	SSO discharge into private property basement.	10/10/2020	9:00 PM	11:00 AM	100 Gallons	Sewer lateral from building damaged by construction activity	Contractor hired by property owner excavated and repaired the sewer lateral.	None. Sewer lateral had been broken during construction of a water main in the street
2019 Reported SSOs								
77 New Street	SSO discharge into private property basement.	5/18/2020	10:50 AM	11:15 PM	100 Gallons	DPW received report of a sewer backup into a building under construction on 5/18/2020	DPW jetted a sewer main on New Street and cleared the blockage.	DPW to monitor New Street line regularly.
238 Main Street and 25 Hayward Street	SSO discharge from pump station failure.	4/28/2020	7:30 AM	9:15 AM	10,000 Gallons	Sewer backed up into building at 238 Main Street and underground parking garage at 25 Hayward streeet due to pump station failure.	City's pump station maintenance contractor cleared blockage in pumps.	Software malfunction on notification system within City SCADA was corrected by CDM Smith.
4 University Road	SSO discharge into private property basement.	2/27/2020	11:00 AM	4:00 PM	Unknown	DPW received a report from facility maintenance concerning a sewer backup on 2/27/2020 at 2:00pm.	DPW jetted the Bennett Street sewer and cleared the blockage.	DPW will have the Bennett St. sewer line inspected with a video camera and will monitor the Bennett St. sewer line.
121 Second Street	SSO discharge into private property basement.	2/25/2020	12:00 PM	4:00 PM	Less than 10 Gallons	DPW received a report from a plumber about a sewer backup into basement on 2/25/20 at 3:30pm.	DPW jetted the Second Street sewer line twice and cleared the blockage	DPW advised the property owner to install and/or maintain backwater valve on the basement fixture.
107-109 Magazine Street	SSO discharge into private property basement.	6/20/2019	4:00 PM	5:00 PM	25 Gallons	DPW received report from resident about a sewer backup into basement that had begun on 6/17/2019	DPW jetted the Magazine sewer line on 6/20 and 6/21/2019 claring the blockage. DPW advised the property owner to have an open drain line in the basement capped and to install backwater valves on basement fixtures.	DPW to monitor Magazine sewer line regularly.
678 Massachusetts Ave	SSO discharge into private property basement.	6/20/2019	1:00 PM	2:30 PM	20 Gallons	DPW received a high water alarm from a sensor in the Mass Ave sewer around 1:00 PM. The property owner discovered a sewer backup around the same time.	DPW jetted the blocked Mass Ave sewer line twice and cleared the blockage.	DPW to advise property owner to install and/or maintain backwater valves on basement fixtures
20 Prospect Street	SSO discharge into private property basement.	4/27/2019 - 4/29/2019	5:00 PM	4:30 PM	20 Gallons	DPW received report from drain company about a sewer backup into the basement of 20 Prospect Street.	DPW jetted the sewer line twice and cleared the line blockage.	DPW will continue to monitor the sewer.

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
149 Alewife Brook Parkway	SSO Discharge from sanitary sewer manhole to ground surface.	4/2/2019 - 4/3/2019	10:30 PM	12:00 AM	50 Gallons	Water coming of a sewer manhole in the parking lot at 11 p.m. on 4/2/19. Surcharged manhole on private property due to blockage in private sewer line.	DPW Sewer Division pumped out manhole and jetted sewer service line and cleared paper towel blockage and vactored up spilled water and cleaned area.	
201 Alewife Brook Parkway	SSO discharge from sanitary sewer manhole to ground surface.	4/1/2019	11:00 AM	12:00 PM	20 Gallons	DPW received call from restaurant regarding sewer back-up. Water level high in the private sewer manhole.	DPW pumped water from private manhole and jetted private sewer service line and City's sewer main as a precaution. Paper towels were observed in the private manhole.	
45 Linnaean Street	SSO discharge into private property basement.	3/17/2019	1:00 PM	9:00 PM	40 Gallons	Sewer system blockage, due to flowable fill in sewage system. High water levels in sewer manholes on Linnaean Street and Walker Street.	DPW Sewer Division jetted the Walker Street sewer line with the assistance of the City's sewer cleaning contractor. Drew down the water level in the Linnaean Street sewers and removed the flowable fill.	DPW will schedule a TV inspection of the sewer lines when a new TV contract is in place to ensure all flowable fill is removed.
Apple Cinemas 168 Alewife Brook Parkway	SSO Discharge from sanitary sewer manhole to Ground Surface	3/9/2019 - 3/10/2019	11:00 PM	1:30 AM	75 Gallons	Water leak called in to Water Department. Department responded and observed discharge from sewer manhole.	DPW Sewer Maintenance responded and affected sewer main was cleared with a water jet / vacuum truck.	
20 Crescent Street	SSO discharge into private property basement.	2/28/2019	12:00 PM	3:30 PM	70 Gallons	Sewer system blockage identified by resident. Private drain company pumped 60 gallons from a basement tub into 5-gallon buckets; 10 Gallons of which spilled onto the basement floor. Resident contacted the DPW who responded and jetted blocked sewer line.	DPW Sewer Division crews responded and jetted a blocked sewer line on Crescent Street.	
Linskey Way behind 300 Third Street	SSO discharge to catch basin / ground surface.	1/29/2019	2:00 PM	3:00 PM	100 Gallons	Backup from catch basin on Linskey Way behind 300 Third Street.	DPW jetted a blocked combined sewer line on Linskey Way. Cleaned street and pumped out catch basin where water collected.	
2018 Reported SSOs								
Audrey Street at Memorial Drive	Sanitary sewer discharge from sanitary sewer manhole to catch basin to receiving water.	12/17/2018	3:00 PM	4:30 PM	100 Gallons	DPW Sewer Division responded to back-up from manhole on Audrey Street at the intersection with Memorial Drive.	DPW Sewer Division crews jetted the sewer line and cleared the blockage. Also pumped out a catch basin where water collected.	DPW will have City's TV contractor televise the section of sewer line where the blockage occurred.

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
3 Healy Street	SSO discharge into private property basement.	9/5/2018	5:00 PM	6:00 PM	Less than 5 Gallons	Sewer pipe obstructed with construction debris. Caused back-up into basement of 3 Healy Street.	DPW pumped out debris and jetted out sewer line.	
580 Massachusetts Avenue	SSO discharge into private property basement.	7/17/2018	5:00 PM	9:00 PM	Unknown	DPW Sewer Division responded to back-up in basement. Nearby manholes full due to rain storm.	DPW returned on 7/18 to jet out the sewer lines.	.
853 Main Street	SSO discharge into private property basement.	7/17/2018	5:00 PM	9:00 PM	10 Gallons	DPW Sewer Division responded to back-up in basement. Nearby manholes full due to rain storm.	DPW jetted the sewer line.	
651 Concord Avenue	SSO discharge into private property basement.	3/13/2018	7:00 PM	9:00 PM	Unknown	DPW Sewer Division responded to back-up in basement.	DWP jetted the sewer line on Concord Avenue.	DPW scheduling a video inspection of this sewer line
202 Green Street	SSO discharge into private property basement.	3/2/2018	7:00 PM	9:00 PM	Unknown	Rain event combined with sewer system blockage resulted in SSO discharge into private property basement.	DPW Sewer Division jetted sewer lines near 202 Green Street and the sewer lines on Brookline Street from Pacific to Green Street.	DPW returned are re-jetted all sewer lines on 3/6/19
404 Broadway	SSO discharge to catch basin to receiving water – Charles River – and backup into private property basement.	2/20/2018 - 2/22/2018	1:00 PM	11:00 AM	Unknown	Private sewer system failed. Water leaked to adjacent sump pump in basement which pumped water outside the building which ran into the catch basin.	DPW informed resident that private sewer repairs were required which were completed on 2/22/18. DPW pumped out the catch basin sump where water collected on 2/20, 22 & 23. All water was contained within catch basin sump. No water entered the City storm drain system.	
2017 Reported SSOs								
303 Third Street	SSO discharge into private property basement.	11/20/2017	7:00 AM	11:00 AM	Unknown	DPW responded to back-up from downstream manhole and cleared the grease blockage.	DPW Sewer Division used it's vactor truck to jet the line from a downstream manhole and cleared the blockage.	DPW will inspect nearby restaurants for proper fats, oils, grease trap maintenance and management. DPW will increase frequency of sewer inspections on Third Street and have TV/Cleaning Contractor perform video inspection.

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
Massachusetts Avenue at Norfolk Street	SSO accidental discharge leak from vactor truck rear door while decanting into sewer manhole. Discharged to ground surface but contained within catch basin and pumped out.	8/3/2017	11:30 AM	11:31 AM	100 Gallons	Accidental release of vactor truck rear door while decanting into sewer manhole.	Rapid Flow washed the water that spilled into the street back into the sewer manhole. DPW responded and vactored up water that pooled in the street and pumped out 2 nearby catch basins	
589 Massachusetts Avenue	SSO discharge due to pipe collapse near Norfolk Street, rain event, and abandoned service connection near 589 Mass Avenue in the sewer main.	7/12 and 7/24/17	7/12 and 7/24/17	Unknown	100 Gallons	Rapid Flow televised the Mass Ave sewer main and observed a hole in the sewer pipe from an abandoned service connection and also observed a pipe collapse in the sewer main near Norfolk Street.	On 8/7/17, the contractor sealed the area near the abandoned service connection with a sectional liner. The City'sremedial repair contractor excavated and replaced 50 feet of broken sewer. Work was completed on 11/8/17.	
195 Grove Street and 169 Grove Street	SSO discharge back up into private property and ground surface.	3/25/17 – 3/26/17	11:30 AM	6:00 PM	100 Gallons	Blockage in sewer line between manholes at 169 and 219 Grove Streets. The back-up in private property was contained within lavatory fixtures – no release to floor.	DPW responded and vactored /jetted the sewer manholes, gravity mains, and force main on Grove Street on 3/25/17. DPW called pump maintenance contractor to rule out pump station issue. Line appeared to be cleared; a second call was received. DPW vactored and jetted Grove Street lines. DPW also called in the TV/Cleaning contractor. Obstruction found and cleared by TV/ Cleaning contractor on 3/26/17.	
426 Huron Avenue	SSO discharge from private sewer service line to a sump pump in a private property basement and was pumped out to ground surface.	1/5/2017 - 1/6/2017	10:00 AM	9:00 AM	50 Gallons	Sewer service line failed and sewage from broken pipe travelled underground to a sump pump in the basement and was pumped out to the ground surface.	DPW required property owner to retain a plumber who located the broken service line under the sidewalk. DPW contractor excavated and repaired broken service line. Broken pipe repaired 1/6/17.	
2016 Reported SSOs								
One Brattle Square Basement	SSO discharge from hole in sanitary sewer pipe which backed up into a private property basement.	7/26/2016 - 7/27/2016	9:00 AM	8:00 AM	10-20 Gallons	SSO discharge from hole in sanitary sewer pipe which backed up into a private property basement.	DPW Contractor patched the hole from outside using a clamp and placed a pipe lining sleeve inside the pipe.	DPW will investigate reason for pipe failure and take corrective measures to replace entire length of pipe, if necessary.
2015 Reported SSOs								

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
30 Arlington Street	SSO discharge from sewer pipe into private property basement.	6/1/2015	11:30 AM	12:00 PM	10 Gallons	DPW tried to jet the Arlington Street combined sewer line and found it to have collapsed near 28 Arlington Street.	The City's remedial repair contractor was called on 6/1/15 to repair the 12" combined sewer line.	
625 Massachusetts Avenue	SSO discharge from broken sewer lateral to ground surface.	3/26/2015	11:30 AM	5:00 PM	400 Gallons	Broken sewer lateral from 625 Mass Avenue. The building sewer service discharges to the sewer line on Bishop Richard Allen Drive.	DPW checked the sewer lines on Bishop Allen drive and jetted them. No problems were found in city sewer lines. DPW pumped out a catch basin where the sewer flow drained to. The catch basin is on a combined sewer system that goes to the MWRA not the river. Property owner hired a private contractor to repair the broken sewer main.	
8 Education Street	SSO discharge from sanitary sewer manhole due to blocked sewer lateral into catch basin to receiving water which discharged to the Charles river.	1/9/2015	11:30 AM	2:00 PM	200 Gallons	A piece of wood 2" x 4" and 2' long was stuck in the service lateral from the building at the wye connection with the city's sewer main.	A private contractor hired by the Director of Facilities of 8 Education Street removed the piece of wood from the service lateral. The maintenance staff protected the storm drain with barriers and used a shop vac to vacuum up water which leaked from the manhole.	
2014 Reported SSOs								
8 Education Street	SSO discharge from sanitary sewer manhole due to blocked sewer lateral into catch basin to receiving water which discharged to the Charles river	11/18/2014	2:00 PM	6:00 PM	200 Gallons	A combination of factors caused the sewer system blockage inside the manhole. Difference in invert elevation and reduced outlet pipe size are the main cause of it.	DPW crews pumped down the manhole and cleared the obstruction. DPW contractor on site now to correct the invert elevation and replace the outlet pipe (from 4" pipe to 8" pipe).	
1662 Massachusetts Avenue	SSO discharge from blocked sewer lateral which backed up into private property basement (Starbucks)	6/29/2014	5:00 AM	1:00 PM	300 Gallons	Plumber cleaned and jetted out the private sewer lateral from clean out and freed the blockage.	DPW jetted the sewer line on Massachusetts Avenue near the store on 6/29/14. No problems were noted in the lines.	
2013 Reported SSOs								

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
Massachusetts Avenue at Alewife Brook Parkway	SSO discharge from CAM401B CSO Regulator Structure direct to Alewife Brook Parkway.	12/2/2013	9:00 AM	11:00 AM	Unknown	During a daily check of the City's SCADA system, the level at CAM401B was showing a CSO activation at this location. The historic level data showed continuous discharge from 401B outfall from the original time of CSO activation until system was checked on 12/2.	A sewer maintenance crew was dispatched to this location with a jet/vacuum truck. The line was jetted, and the blockage was cleared and sewer discharge to MWRA was restored.	
89 Walden Street	SSO discharge into private property basement.	11/27/2013	1:00 PM	7:00 PM	10-15 Gallons	Broken sewer main with pipe collapse.	DPW contractor did a temporary repair on the broken sewer main on 11/27 and a permanent repair on 11/29/13.	
17 Dunster Street	SSO discharge through pipe fittings on service line into private property basement.	10/2/2013	11:00 AM	11:20 AM	500 Gallons	DPW jetted the main on Dunster Street to clear an obstruction The water entered the basement through the pipe fittings on the service line. Clean-out had been opened through the owner's plumber to snake the service line.	The owner contacted a clean-up company to remove water, carpets, wallboard and sanitize basement.	DPW to regularly inspect sewer main on Dunster Street and jet lines as necessary..
Wadsworth Street at Memorial Drive	SSO discharge from common manhole and storm drain outfall direct to receiving water Charles River.	9/12/2013	4:00 PM	6:00 PM	Over 10,000 Gallons	A blockage in the sewer line from a common manhole on Wadsworth Street with a connection to the Wadsworth Street stormwater outfall resulted in a discharge of sewer water to the outfall.	Cambridge DPW sewer crews removed the separation plate inside the common manhole and jetted all sewer lines entering and leaving the common manhole. The blockage was cleared.	The common manhole will be removed under Contract #7.
148 Mt Auburn Street	SSO discharge into private property basement.	3/25/2013 & 3/26/2013	1:00 PM	unknown	10 Gallons	Blockage in sewer line caused backup into basement.	DPW sewer crews cleaned line removing debris.	
381 Prospect Street	SSO discharge into private property basement.	2/25/2013	7:00 AM	8:00 AM	10-20 Gallons	Pipe collapse with sewage lateral blockage.	Plumber cleaned and jetted the sewer lateral from clean out and freed the blockage. DPW jetted both the sewer and combined sewer lines on Prospect Street and Cambridge Street on 2/22 and again on 2/25/13. No problems were noted in the lines.	
2012 Reported SSOs								

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
12 Museum Way	SSO discharge private property basement	10/18/2012	11:30 AM	12:00 PM	Unknown	DPW staff reported to this location upon receiving a report that a sewer manhole was overflowing from the location. The DPW inspected that manhole as well as several others and were able to determine the obstruction location which was in the line that services the adjacent high-rise buildings' high-pressure hoses and jetting heads.	The DPW broke through the obstruction and the line immediately began flowing again.	DPW to schedule follow-up meeting
125 Portland Street	SSO discharge to private alleyway and city street.	5/7/2012	4:30 PM	Unknown	10 Gallons	Discharge resulted from cracked sewer lateral and discharged to the city street and alleyway.	Disinfection treatment was performed, and homeowners were informed about cracked sewer lateral. The DPW checked the lines and confirmed no problems.	
101 Acorn Park Drive	SSO/Unanticipated Bypass Overflow Discharge	4/19/2012	7:30 AM	Unknown	1000 Gallons	Water Department mistakenly closed a sewer force main isolation valve on the force main from Discovery Park Sewer Pump Station. The force main leaked at a location between the pumps and check valves.	The water department was informed of the location of the isolation valve on the force main from the Discovery Park Sewer Pump Station.	
146 Mt. Auburn Street	SSO discharge to private property basement.	3/25/12 & 3/26/12	1:00 PM	Unknown	10 Gallons	Discharge resulting from sewer system blockage or collapse.	Sewer crews cleaned line and removed debris.	
48 Porter Road	SSO discharge to private property basement.	2/14/2012	5:00 PM	Unknown	10 Gallons	Sewer system blockage or collapse.	DPW checked the lines and confirmed no problems and homeowner was notified of findings.	
126 Mt. Auburn Street	SSO discharge to private property basement.	1/25/2012	10:30 AM	Unknown	50 Gallons	DPW's TV and cleaning contractor televised the 10" sanitary line on Nutting Road and identified a root ball blocking the sanitary flow from upstream.	Remedial contractor on-site the following day to excavate and remove the obstruction.	
2011 Reported SSOs								
126 Mt. Auburn Street	SSO discharge to private property basement.	3/15/2011	12:50 PM	Unknown	400 Gallons	Eight-inch sanitary sewer main on Nutting Road became obstructed with tree roots and other debris. The sanitary sewer backed up through the floor drains to the basement of 126 Mt. Auburn Street.	National Water Main was able to remove the root ball causing the obstruction.	The city will monitor this line at regular intervals to minimize any future backups.

SSO Location	Discharge Statement	Date	Time Start	Time End	Estimated Volume	Description	Mitigation Completed	Mitigation Planned
859 Massachusetts Avenue	SSO discharge to private property basement.	3/14/2011	11:50 AM	Unknown	1000 Gallons	The sanitary sewer main on Clinton Street became obstructed with debris. The sanitary sewer backed up through cleanout into the basement of the property.	DPW vactored out the manhole and removed the obstruction in the line.	City will add this main line to our routine maintenance list to minimize any future backups.
301 Binney Street	SSO discharge to ground and private property basement.	1/24/2011	2:30 PM	Unknown	Less than 10,000 Gallons	A sewer flap was seized due to freezing temperatures and this caused the back-up onto private property	Sewer was repaired and blockage cleared.	
Cambridge Park Drive	SSO discharge to the ground	1/24/2011	2:30 PM	Unknown	Less than 10,000 Gallons	Sewer system blockage or collapse caused the SSO discharge. Due to inclement weather, the line was not inspected.	Sewer was repaired and blockage was cleared. This section of sewer line was supposed to be inspected bi-weekly and is included in routine maintenance.	

APPENDIX D

Outfall Priority Ranking

Catchment Summary Table and Priority Ranking - June 2026

Catchment Number	Catchment Name	Category	Catchment Investigation STATUS
D03B	Museum Way	High	Complete
D10	Endicott St	High	Complete
D12	Talbot St	High	Complete
D15	Pearl St	High	Complete
D17A	Western Ave	High	Complete
D28	Brewer St	High	Complete
D30	Willard	High	Complete
D31	Sparks St	High	Complete
D33	Blanchard Rd @ Wellington Brook	High	Complete
D33A	Blanchard Rd	High	Complete
D38	North of Cambridgepark Drive (Sherman & Danehy)	High	Complete
D44	Matignon Rd	Problem	Complete
D46	Acorn Park Drive	High	Complete
D50	Cemetery Drainage 237	High	Complete
D52_1	Russell Field (D52OF0110)	High	Complete
D52_2	Russell Field (D52OF0105)	High	Complete
D02	Lechmere Canal	High	Under Investigation
D03C	North Point	High	Under Investigation
D04	Main St	High	Under Investigation
D05	Wadsworth St	High	Under Investigation
D06	Ames St	High	Under Investigation
D07	Broad Canal	High	Under Investigation
D08	Mass Ave @ Mem Drive	High	Under Investigation
D09	Danforth St	High	Under Investigation
D11	Amesbury St	High	Under Investigation
D11B	Audrey St	High	Under Investigation
D13	MOB Highway to Lechmere Canal (previously D03D)	High	Under Investigation
D16	Pleasant St	High	Under Investigation
D18	Hingham St	High	Under Investigation
D19	Flagg St	High	Under Investigation
D21	Dewolfe St	High	Under Investigation
D25	JFK West	High	Under Investigation
D27	University Rd	High	Under Investigation
D34	Normandy Terrace	High	Under Investigation
D36	Stormwater Wetland Forebay	High	Under Investigation
D40	Harrison Avenue	High	Under Investigation
D53	Binney St	High	Under Investigation
D55	River St	High	Under Investigation
IC-23	JFK East- outgoing to DCR outfall D23OF0000	High	Under Investigation
IC-51A	West Kendall St/Linskey - outgoing to private	High	Under Investigation
IC-51B	East Kendall St/Linskey - outgoing to private	High	Under Investigation

APPENDIX E

Field Forms and Chain of Custody Forms

Field Form: Outfalls

Field	Drop-Downs
Inspection Date	
Inspected By	
Inspection Company	City of Cambridge SDE, Inc
Full Name	
Inspection Time	
Dry or Wet	Dry Wet
Weather	Cloudy Partly Cloudy Raining Sunny
Air Temperature	C F K
Precipitation Antecedent 24 Hour	<0.1 inch >0.1 inch
Outfall Located	No Yes
Outfall Accessible	
Outfall Sign Present	
Sedimentation	High Sedimentation No Sedimentation Slight Sedimentation
Scour Protection Condition	Failing Fair Good NA
Standing Water	No Yes
Standing Water Color	Clear Cloudy Other
Standing Water Other Color	
Sample Location	Catch Basin Manhole Outfall
Flow	No Yes
Flow Color	Clear Cloudy Other Yellow

Field	Drop-Downs
Other Color	
Velocity	Fast Medium None Slow
Depth of Flow	cm chain ft in km m mi mm yd
Sediment	No Yes
Sediment Percent	
Deposits or Stains	No Yes
Turbidity	Clear Cloudy Opaque Suspended Solids
Floatables	Foam None Oily Sheen Organic Matter Other Trash
Other Floatables	
Odor	Musty None Other Rotten Eggs Sewage
Other Odor	
Samples Collected	No Yes
Reason for not Sampling	
PH	mg/l NBU parts/mil ph ton
Water Temperature	

Field	Drop-Downs
Specific Conductivity us	
Salinity ppt	
Ammonia	No Yes
Ammonia Value	mg/l NBU parts/mil ph ton
Surfactants	No Yes
Surfactants Value	mg/l NBU parts/mil ph ton
Chlorine	No Yes
Chlorine Value	mg/l NBU parts/mil ph ton
Type of Bacteria	
Bacteria Result	
Bacteria Duplicate Sample	No Yes
Bacteria Duplicate Sample Results	
Pollutants of Concern	No Yes
POC 1 Results	
POC 1 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 2 Results	
POC 2 Type	BOD5 Chloride Dissolved Oxygen Enterococcus

Field	Drop-Downs
	Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 3 Results	
POC 3 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 4 Results	
POC 4 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 5 Results	
POC 5 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 6 Results	
POC 6 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 7 Results	

Field	Drop-Downs
POC 7 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 8 Results	
POC 8 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
POC 9 Results	
POC 9 Type	BOD5 Chloride Dissolved Oxygen Enterococcus Oil and Grease Total Copper Total Lead Total Phosphorus TSS
Outfall Condition	Failing Fair Good
Notes	

Field Form: Manholes

Field	Drop-Downs
Street Number	
Street Name	
Inspection Date	
Inspector	Ana Huberty Chris Trickett Coiln Brown Elizabeth Olson Garrett Bergey Jillian Henrichon Liz Earley Luis Cornieles Meaghan O'Dwyer Meghan McCudden Michael Sullivan Nicholas Kaminski Randy Jaime Rebecca Kammerer Sarah Ray Simon Klee
NASSCO Certificate	
Full Name	
Purpose of Survey	A = Maintenance Related B = Infiltration and Inflow Investigation C = Post-rehabilitation Survey D = Pre-rehabilitation Survey E = Pre-acceptance (new sewers) F = Routine Assessment G = Capital Improvement Program Assessment H = Resurvey I = Sewer System Evaluation Survey (SSES) R = Pre-Existing Video or Photographs X = Not Known
Inspection Level	Level 1 Level 2
Inspection Status	BM = Buried and Marked DI = Descent Inspection NA = No Access NF = Not Found NI = Traffic NO = Not Opened RI = Remote Inspection SD = Surcharged/Debris SI = Surface Inspection

Field	Drop-Downs
Catchment	D02 - Lechmere Canal D03B - Museum Way D03C - North Point D04 - Main St D05 - Wadsworth St D06 - Ames St D07 - Broad Canal D08 - Mass Ave @ Mem Drive D09 - Danforth St D10 - Endicott St D11 - Amesbury St D12 - Talbot St D15 - Pearl St D16 - Pleasant St D17A - Western Ave D18 - Hingham St D19 - Flagg St D21 - Dewolfe St D22 - Kirkland D23 - JFK East D25 - JFK West D27 - University Rd D28 - Brewer St D31 - Sparks St D33 - Blanchard Rd @ Wellington Brook D33A - Blanchard Rd D34 - Normandy Terrace D36 - Stormwater Wetland Forebay D38 - N of Cambridgepark Drive (Sherman & Danehy) D40 - Harrison Avenue D44 - Matignon Rd D46 - Acorn Park Drive D50 - Cemetery Drainage 237 D51 - Kendall St D53 - Binney St D55 - River St
Inspection Type	Not Found Other Post Correction - Sandbag Post Correction - Surface Surface
Access Type	ACB = Catch Basin ACOH = Cleanout House ACOM = Cleanout Mainline ACOP = Cleanout Property AJB = Junction Box

Field	Drop-Downs
	AM = Meter AMH = Manhole AOC = Other Special Structure AWA = Wastwater Access SAWW = Wet Well
Mapped Correctly	No Yes
MH Grade	Above Grade At Grade Below Grade
Pavement Condition	Fair Good Poor
Cover Condition	Bolts Missing Broken Corroded (Pitted) Cracked Missing Restrain Defective Restraint Missing Sound
Ring Type	A = Adjustable N = None S = Solid
Ring Condition	Broken Corroded (Pitted) Cracked Leaking N/A Poor Installation Sound
Frame Condition	Broken Coated Corroded (Pitted/Worn) Cracked Missing Sound
Chimney Condition	D = Defective N/A S = Sound X = Not Known
Cone Condition	
Wall Condition	
Bench Condition	
Channel Condition	
Needs Cleaning	No Yes
Needs Repair	
Condition	Pass

Field	Drop-Downs
	Questionable- Reinspect Fail
Notes	

Field Form: Pipes

Field	Drop-Downs
Inspection Date	
Inspector	Ana Huberty Chris Trickett Coiln Brown Elizabeth Olson Garrett Bergey Jillian Henrichon Liz Earley Luis Cornieles Meaghan O'Dwyer Meghan McCudden Michael Sullivan Nicholas Kaminski Randy Jaime Rebecca Kammerer Sarah Ray Simon Klee
Full Name	
Inspection Company	City of Cambridge SDE, Inc
Catchment	
Time Since Last Rain	<24 Hours >24 Hours
Downstream Manhole ID	
Pipe Direction	E N NE NW S SE SW W
Standing Water	No Yes
Color of Standing Water	Brown Clear Cloudy Grey Other Suspended Solids Yellow
Flow in Manhole	No Yes

Field	Drop-Downs
Flow Color	Brown Clear Cloudy Grey Other Suspended Solids Yellow
Flow Depth	cm chain ft in km m mi mm yd
Flow Velocity	Fast Medium Slow
Blockage	No Yes
Sediment	
Sediment Percent	
Floatables	Foam None Oily Sheen Other Sewage Trash
Odor	Musty None Oil Other Sewage Soap
Temperature	C F K
PH	
Specific Conductivity uS	
Salinity ppt	
Ammonia	No Yes
Ammonia Value	mg/l NBU parts/mil

Field	Drop-Downs
	ph ton
Surfactants	No Yes
Surfactants Value	mg/l NBU parts/mil ph ton
Chlorine	No Yes
Chlorine Value	mg/l NBU parts/mil ph ton
Sandbag Installed Date	
Sandbag Check Date	
Sandbag Recheck Date	
Sandbag Flow Captured	Fouled No Yes
Contamination Found By	N/A - Partial Inspection N/A - Standing Water None, by Sandbag/Test Kit Not Found Other Positive Lab Bacteria – None by Test Kit Positive Test Kit During Sandbagging Positve Test Kit During Inspection Visual Evidence During Inspection Visual Evidence During Sandbagging
Date Reported	
Upstream Clean	
E Coli Results	
E Coli Duplicate Results	
Lab Ammonia Results	
Lab Surfactants Results	
Inspection Results	Clean Incomplete/In-Progress Standing Water Contaminated, No MS4 Requirements Contaminated, Triggers MS4
Notes	

Field Form: Buildings

Field	Drop-Downs
Inspection Date	
Street Number	
Street Name	
Catchment	D02 - Lechmere Canal D03B - Museum Way D03C - North Point D04 - Main St D05 - Wadsworth St D06 - Ames St D07 - Broad Canal D08 - Mass Ave @ Mem Drive D09 - Danforth St D10 - Endicott St D11 - Amesbury St D12 - Talbot St D15 - Pearl St D16 - Pleasant St D17A - Western Ave D18 - Hingham St D19 - Flagg St D21 - Dewolfe St D22 - Kirkland D23 - JFK East D25 - JFK West D27 - University Rd D28 - Brewer St D31 - Sparks St D33 - Blanchard Rd @ Wellington Brook D33A - Blanchard Rd D34 - Normandy Terrace D36 - Stormwater Wetland Forebay D38 - N of Cambridgepark Drive (Sherman & Danehy) D40 - Harrison Avenue D44 - Matignon Rd D46 - Acorn Park Drive D50 - Cemetery Drainage 237 D51 - Kendall St D53 - Binney St D55 - River St
Testing Company	City of Cambridge SDE, Inc.
Technician Name	Ana Huberty Chris Trickett

Field	Drop-Downs
	Coiln Brown Elizabeth Olson Garrett Bergey Jillian Henrichon Liz Earley Luis Cornieles Meaghan O'Dwyer Meghan McCudden Michael Sullivan Nicholas Kaminski Randy Jaime Rebecca Kammerer Sarah Ray Simon Klee
Test Results	Dye in SMH and DMH Legal No Dye Observed No Fixtures Not Legal
Floors	1 2 3 4 5 6+ NA
Building Type	1-Family Residential 2-Family Residential 3-Family Residential 4-Family Residential Apartments Church/Meeting Hall Educational Industrial Manufacturing Medical N/A Retail/Commercial
Flat Roof	No Yes
Downspouts	Into Foundation Into Foundation and Into Ground Into Ground N/A None Not Visible

Field	Drop-Downs
	To Ground Surface To Surface and Into Foundation To Surface and Into Ground
Access By	
Over 18	No Yes
Appointment	No Yes
Basement	No Yes
Basement Plumbing Fixtures	N/A None Sink Sink, Toilet Sink, Washing Machine Sink, Washing Machine, Toilet Sink, Washing Machine, Toilet, Shower/Bathtub Toilet Toilet, Sink, Shower/Bathtub Washing Machine
Basement Pipes Connect	N/A No No Access to Discharge Pipes Unable to Confirm Partial Acccess to Discharge Yes
Building Pipes Connect	N/A No No Access to Discharge Pipes Unable to Confirm Partial Acccess to Discharge Yes
Multiple Service Connections	N/A No No Access To Discharge Pipes Unable to Confirm Partial Acccess to Discharge Yes
Fixtures Tested	Manhole Other Sink - Basement Sink - Floor 1 Sink - Floor 2 Sink - Floor 3 Sink - Floor 4+ Toilet - Basement Toilet - Floor 1 Toilet - Floor 2 Toilet - Floor 3

Field	Drop-Downs
	Toilet - Floor 4+ Washing Machine - Basement Washing Machine - Floor 1 Washing Machine - Floor 2 Washing Machine - Floor 3 Washing Machine - Floor 4+
Sump Pump Discharge	Ground Surface No Sump Pump Sanitary Sewer Storm Drain Unknown
Mapped Correctly	No Yes
Sewer Manhole	
Dye Observed SMH	No Yes
Drain Manhole	
Dye Observed DMH	No Yes
Other Manhole 1	
Dye Observed Other Manhole 1	No Yes
Other Manhole 2	
Dye Observed Other Manhole 2	No Yes
Reported Date	
Test Results	Legal Corrected No Fixtures No Dye Observed Dye in SMH and DMH Not Legal
Notes	

New England Testing Laboratory
59 Greenhill Street
West Warwick, RI 02893
1-888-863-8522

Chain of Custody Record

Project No.	**Project Name/Location:**				**Matrix**					**Tests****								
Client:																		
Report To:																		
Invoice To:																		
Date	**Time**	**Comp**	**Grab**	**Sample I.D.**	**Aqueous**	**Soil**	**Other**	**No. of Containers**	**Preservative**									
Sampled By:		Date/Time		Received By:		Date/Time		Laboratory Remarks:		Special Instructions:								
Relinquished By:		Date/Time		Received By:		Date/Time		Temp. Received:_____										
**Netlab Subcontracts the following tests: Radiologicals, Radon, TOC, Asbestos, UCMRs, Perchlorate, Bromate, Bromide, Sieve, Salmonella, Carbamates										Turnaround Time [Business Days]: **5 Days**								

APPENDIX F

Water Quality Analysis Instructions, Users' Manuals

1. Surfactants: CHEMetrics Test Kit Instructions (K-9400)
2. Ammonia: DR-890 Instructions (Method 8155)
3. Total Chlorine: DR-890 Instructions (Method 8167)
4. Dissolved Oxygen: DR-890 Instructions (Method 8166)
5. AquaTROLL 500 Operator's Manual (Salinity, Conductivity, Temperature, pH)
6. Ammonia: CHEMetrics Test Kit Instructions (K-1510)
7. Oaklon PCTSTr 50 Operating Instructions (Salinity, Conductivity, Temperature, pH)
8. Chlorine: Hach DR300 (Method 8167)

Detergents CHEMets Kit

K-9400/R-9400: 0 - 3 ppm

Test Procedure

1. Rinse the reaction tube with the sample to be tested, and then fill it to the 5 mL mark with the sample.
2. While holding the double-tipped ampoule in a vertical position, snap the upper tip using the tip breaking tool (fig. 1).
3. Invert the ampoule and position the open end over the reaction tube. Snap the upper tip and allow the contents to drain into the reaction tube (fig. 1).
4. Cap the reaction tube and shake it vigorously for **30 seconds**. Allow the tube to stand undisturbed for **1 minute**.

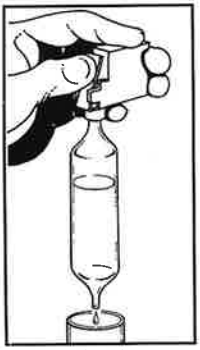


Figure 1

5. Make sure that the flexible tubing is firmly attached to the CHEMet ampoule tip.
6. Insert the CHEMet assembly (tubing first) into the reaction tube making sure that the end of the flexible tubing is at the bottom of the tube. Break the tip of the CHEMet ampoule by gently pressing it against the side of the reaction tube (fig. 2). The ampoule should draw in fluid only from the organic phase (bottom layer).
7. When filling is complete, remove the CHEMet assembly from the reaction tube.

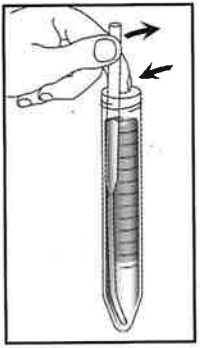


Figure 2

8. Remove the flexible tubing from the CHEMet ampoule and wipe all liquid from the exterior of the ampoule. Place an ampoule cap firmly onto the tip of the CHEMet ampoule. Invert the ampoule several times, allowing the bubble to travel from end to end.

9. Obtain a test result by placing the ampoule, flat end first, into the comparator. Hold the comparator up toward a source of light and view from the bottom. Rotate the comparator until the best color match is found (fig. 3).

Figure 3

Tip Breaker

The tip breaker opens for easy disposal of the glass tips (pull lever away from body of tip breaker or pull open the side wall). The tip breaker will work most effectively if the tips are emptied out frequently.

Test Method

The Detergents CHEMets®[1] test kit employs the methylene blue extraction method[2,3,4]. Anionic detergents react with methylene blue to form a blue complex that is extracted into an immiscible organic solvent. The intensity of the blue color is directly related to the concentration of "methylene blue active substances (MBAS)" in the sample. Anionic detergents are one of the most prominent methylene blue active substances. Test results are expressed in ppm (mg/Liter) linear alkylbenzene sulfonate (equivalent weight 325).

1. CHEMets is a registered trademark of CHEMetrics, Inc. U.S. Patent No. 3,634,038
2. APHA Standard Methods, 21st ed., method 5540 C (2005)
3. EPA Methods for Chemical Analysis of Water and Wastes, method 425.1 (1983)
4. ASTM D 2330-02, Methylene Blue Active Substances

Safety Information

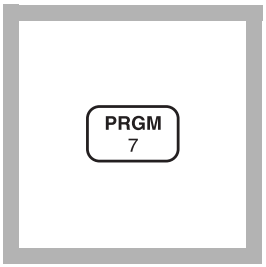
Read MSDS (available at www.chemetrics.com) before performing this test procedure. Wear safety glasses and protective gloves.

CHEMetrics
Water Analysis Systems

www.chemetrics.com
4295 Catlett Road, Midland, VA 22728 U.S.A.
Phone: (800) 356-3072; Fax: (540) 788-4856
E-Mail: orders@chemetrics.com

Sept. 12, Rev. 9

Salicylate Method*

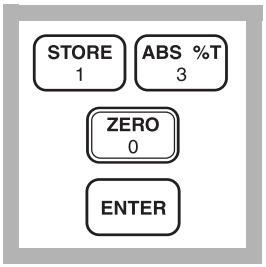


1. Enter the stored program number for ammonia nitrogen (NH_3-N).

Press: **PRGM**

The display will show:

PRGM ?



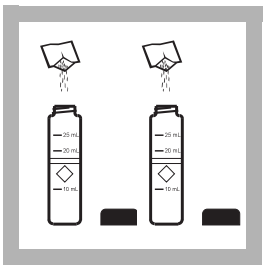
2. Press: 130 ENTER

The display will show **mg/L, NH3-N** and the **ZERO** icon**.**

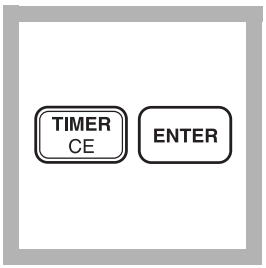
Note: *For alternate forms (NH_3, NH_4), press the* **CONC** *key.*

3. Fill a sample cell with 10 mL of deionized water (the blank).

4. Fill a second sample cell with 10 mL of the sample.



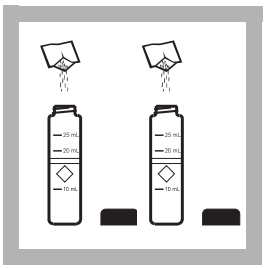
5. Add the contents of one Ammonia Salicylate Reagent Powder Pillow to each sample cell. Cap both cells and shake to dissolve.



6. Press:

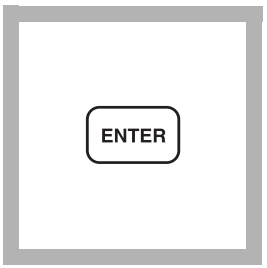
TIMER ENTER

A 3-minute reaction period will begin.



7. After the timer beeps add the contents of one Ammonia Cyanurate Reagent Powder Pillow to each sample cell. Cap the cells and shake to dissolve the reagent.

Note: *A green color will develop if ammonia nitrogen is present.*

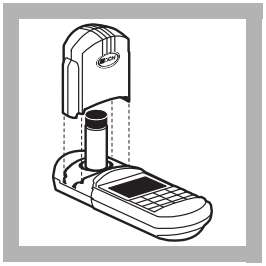


8. The display will show:
15:00 TIMER 2

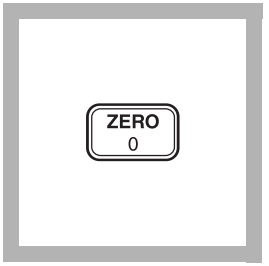
Press: **ENTER**

A 15-minute reaction period will begin.

* Adapted from Clin. Chim. Acta., 14 403 (1966)



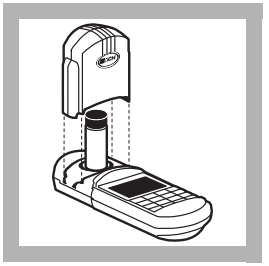
9. After the timer beeps, place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



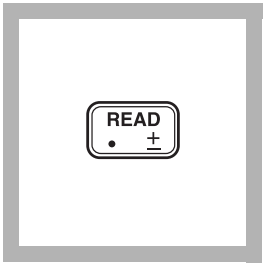
10. Press: **ZERO**

The cursor will move to the right, then the display will show:

0.00 mg/L NH3-N



11. Place the prepared sample into the cell holder. Tightly cover the sample cell with the instrument cap.



12. Press: **READ**

The cursor will move to the right, then the result in mg/L ammonia nitrogen will be displayed.

Note: *Standard Adjust may be performed using a prepared standard.*

Sampling and Storage

Collect samples in clean plastic or glass bottles. Most reliable results are obtained when samples are analyzed as soon as possible after collection.

If chlorine is known to be present, the sample must be treated immediately with sodium thiosulfate. Add one drop of Sodium Thiosulfate Standard Solution, 0.1 N, for each 0.3 mg of chlorine present in a one liter sample.

To preserve the sample, adjust the pH to 2 or less with concentrated sulfuric acid (about 2 mL per liter). Store samples at 4 °C or less. Samples preserved in this manner can be stored up to 28 days. Just before testing the stored sample, warm to room temperature and neutralize with 5.0 N Sodium Hydroxide Standard Solution. Correct the test result for volume additions.

Accuracy Check

Standard Additions Method

1. Fill three sample cells with 10 mL of sample.

2. Use the TenSette Pipet to add 0.1, 0.2 and 0.3 mL of Ammonium Nitrogen Standard, 10 mg/L as NH_3-N to the three samples. Stopper the cells and mix well.

3. Analyze each spiked sample as described above. The ammonia nitrogen concentration should increase by 0.10 mg/L for each 0.1 mL of standard added.

4. If these increases do not occur, refer to Standard Additions in a DR/800-series Procedures manual for more information.

Standard Solution Method
Prepare a 0.50 mg/L ammonia nitrogen standard solution as follows:

1. Dilute 5.00 mL of the Ammonia Nitrogen Standard Solution, 10 mg/L, to 100 mL with deionized water. Or, use the TenSette Pipet to prepare a 0.50 mg/L ammonia nitrogen standard by diluting 1.0 mL of an Ammonia Nitrogen Voluette Standard Solution, 50 mg/L as NH_3-N, to 100 mL with deionized water.

2. Use the prepared 0.50 mg/L ammonia nitrogen standard solution in place of the sample in step 4 of the test procedure.

Method Performance

Precision
In a single laboratory using a standard solution of 1.00 mg/L ammonia nitrogen (NH_3-N) and two representative lots of reagent with the instrument, a single operator obtained a standard deviation of $\pm$0.08 mg/L ammonia nitrogen.

Estimated Detection Limit
The estimated detection limit for Method 8155 is 0.02 mg/L NH_3-N. For more information on the estimated detection limit, see *Section 1* of a DR/800-series *Procedure Manual*.

Interferences

Interfering Substances and Suggested Treatments.

Interfering Substance	Interference Level and Treatments
Calcium	Greater than 1000 mg/L as $CaCO_3$
Glycine, hydrazine	Less common. Will cause intensified colors in the prepared sample.

Interfering Substance	Interference Level and Treatments
Iron	All levels. Correct for iron interference as follows: **1.** Determine the amount of iron present in the sample using one of the Total Iron procedures. **2.** Prepare a deionized water sample containing the same iron concentration as the original sample. Run the procedure on this solution to determine the interference due to iron. Subtract this value from the result in Step 12 obtained on the original sample.
Magnesium	Greater than 6000 mg/L as $CaCO_3$
Nitrate	Greater than 100 mg/L as NO_3^--N
Nitrite	Greater than 12 mg/L as NO_2^--N
Phosphate	Greater than 100 mg/L as PO_4^{3-}-P
Sulfate	Greater than 300 mg/L as SO_4^{2-}
Sulfide	Sulfide will intensify the color. Eliminate sulfide interference as follows: **1.** Measure about 350 mL of sample in a 500-mL erlenmeyer flask. **2.** Add the contents of one Sulfide Inhibitor Reagent Powder Pillow. Swirl to mix. **3.** Filter the sample through a folded filter paper. **4.** Use the filtered solution in Step 4 of the test procedure.
Turbidity, sample color	Turbidity and sample color will give erroneous high values. Samples with severe interferences require distillation. Albuminoid nitrogen samples also require distillation. Refer to Optional Apparatus for distillation equipment.

Summary of Method

Ammonia compounds combine with chlorine to form monochloramine. Monochloramine reacts with salicylate to form 5-aminosalicylate. The 5-aminosalicylate is oxidized in the presence of a sodium nitroprusside catalyst to form a blue-colored compound. The blue color is masked by the yellow color from the excess reagent present to give a final green-colored solution.

Instrument Setup

The following procedure will add program 130 to a DR/850 or DR/890 instrument.

1. Turn on the instrument by pressing the **ON** key.

2. Press the **SETUP** key.

3. Press the **DOWN** arrow key until the prompt line shows USER.

4. Press the **ENTER** key.

5. Enter “8138”, followed by **ENTER**.

Note: *The arrow keys can be used to scroll and review or change numbers at any time.*

6. Refer to the following table and enter the number from the “Enter” column that corresponds to line number 1 on the display. Press **ENTER**. Repeat for lines 2–56 on the display.

Line Number	Enter	Line Number	Enter
1	130	29	0
2	42	30	78
3	74	31	72
4	0	32	52
5	0	33	0
6	0	34	0
7	0	35	63
8	0	36	155
9	0	37	165
10	0	38	227
11	0	39	63
12	63	40	164
13	45	41	221
14	158	42	47
15	131	43	0
16	0	44	110
17	0	45	128
18	0	46	0
19	0	47	20
20	78	48	0
21	72	49	180
22	51	50	3
23	45	51	132
24	78	52	0
25	78	53	0
26	72	54	23
27	51	55	0
28	0	56	255

REQUIRED REAGENTS AND APPARATUS

Description	Qty/Test	Unit	Cat. No.
Ammonia Nitrogen Reagent Set, for 10-mL samples (100 tests)			2668000
Includes:			
(2) Ammonia Cyanurate Reagent Powder Pillows	2 pillows	100/pkg	2653199
(2) Ammonia Salicylate Reagent Powder Pillows	2 pillows	100/pkg	2653299
Sample Cell, 10-20-25 mL, w/ cap	2	6/pkg	2401906

OPTIONAL REAGENTS

Ammonia Nitrogen Standard Solution, 10 mg/L as NH_3-N	500 mL	15349
Ammonia Nitrogen, PourRite Ampules, 50 mg/L as NH_3-N, 2 mL	20/pkg	1479120
Sodium Hydroxide Standard Solution, 5.0 N	50 mL SCDB	245026
Sodium Thiosulfate Standard Solution, 0.1 N	100 mL MDB	32332
Sulfide Inhibitor Reagent Powder Pillows	100/pkg	241899
Sulfuric Acid, concentrated, ACS	500 mL	97949
Water, deionized	4 L	27256

OPTIONAL APPARATUS

Distillation Heater and Support Apparatus, 115 V	each	2274400
Distillation Heater and Support Apparatus, 230 V	each	2274402
Distillation Set, General Purpose	each	2265300
Filter Paper, folded, 12.5 cm	100	189457
Flask, volumetric, Class A, 100 mL	each	1457442
Funnel, poly, 65 mm	each	108367
Pipet, TenSette, 0.1 to 1.0 mL	each	1970001
Pipet Tips, for 1970001 TenSette Pipet	50/pkg	2185696
Pipet Tips, for 1970001 TenSette Pipet	1000/pkg	2185628
Pipet, volumetric, Class A, 5.0 mL	each	1451537
Pipet Filler, safety bulb	each	1465100
PourRite Ampule Breaker Kit	each	2484600

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WORLD HEADQUARTERS
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FAX: (970) 669-2932

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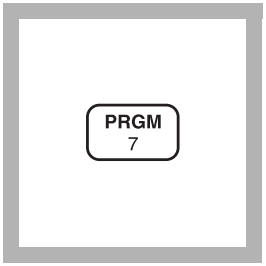
CHLORINE, TOTAL (0 to 2.00 mg/L)

DPD Method (Powder Pillows or AccuVac Ampuls)

USEPA accepted for reporting water and wastewater analyses*

Using Powder Pillows



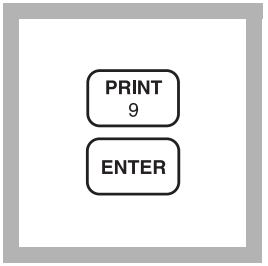
1. Enter the stored program number for total chlorine (Cl_2) powder pillows.

Press: **PRGM**

The display will show:

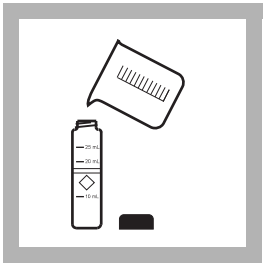
PRGM ?

Note: *For most accurate results, perform a Reagent Blank Correction using deionized water (see Section 1).*



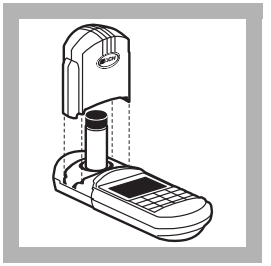
2. Press: **9 ENTER**

The display will show **mg/L, Cl2** and the **ZERO** icon**.**



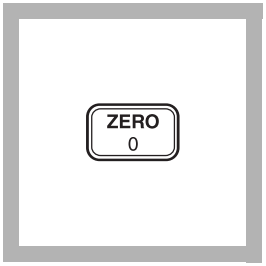
3. Fill a sample cell with 10 mL of sample (the blank).

Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*



4. Place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.

* Procedure is equivalent to USEPA method 330.5 for wastewater and Standard Method 4500-Cl G for drinking water.

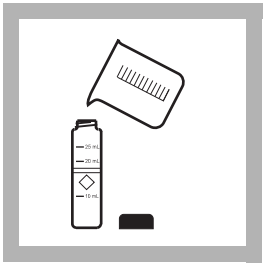


5. Press: **ZERO**

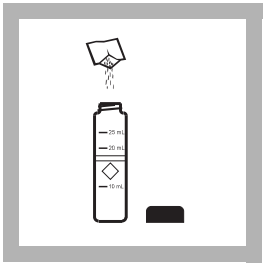
The cursor will move to the right, then the display will show:

0.00 mg/L Cl2

Note: *If Reagent Blank Correction is on, the display may flash "limit". See Section 1.*

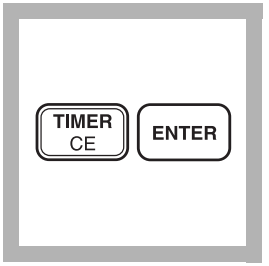


6. Fill a second cell to the 10-mL mark with sample.



7. Add the contents of one DPD Total Chlorine Powder Pillow to the sample cell (the prepared sample). Cap and swirl the sample cell vigorously to dissolve the powder.

Note: *It is not necessary that all the powder dissolves.*

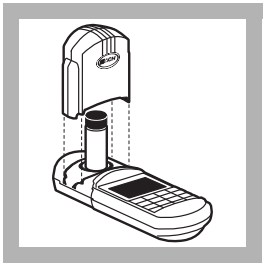


8. Press:

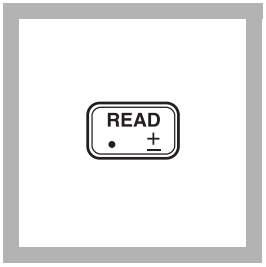
TIMER ENTER

A three-minute reaction period will begin. A pink color will develop if chlorine is present.

Note: *The SwifTest Dispenser for Total Chlorine can be used in place of the powder pillows in step 7.*



9. After the timer beeps, place the prepared sample into the cell holder. Tightly cover the sample cell with the instrument cap.



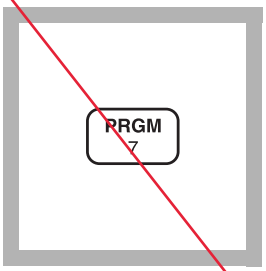
10. Press: **READ**

The cursor will move to the right, then the result in mg/L total chlorine will be displayed.

Note: *It the sample temporarily turns yellow after sample addition, or the display flashes "limit", it is due to high chlorine levels. Dilute a fresh sample and repeat the test. A slight loss of chlorine may occur during dilution. Multiply the result by the dilution factor; see Section 1. Or use the High Range Total Chlorine test, program #8.*

Note: *Standard Adjust may be performed using a prepared standard (see Standard Adjust in Section 1).*

Using AccuVac Ampuls



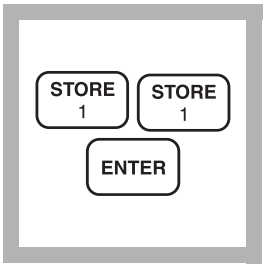
1. Enter the stored program number for total chlorine (Cl_2) AccuVac Ampuls.

Press: **PRGM**

The display will show:

PRGM ?

Note: *For most accurate results, perform a Reagent Blank Correction using deionized water (see Section 1).*

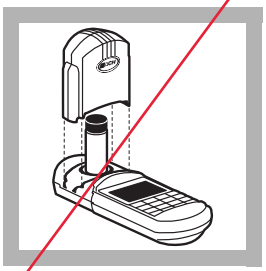


2. Press: **11 ENTER**

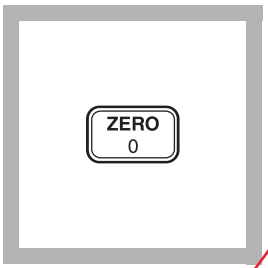
The display will show **mg/L, Cl2** and the **ZERO** icon.

3. Fill a sample cell with at least 10 mL of sample (the blank). Collect at least 40 mL of sample in a 50-mL beaker.

Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*



4. Place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.

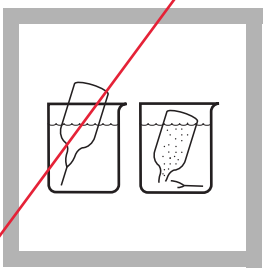


5. Press: **ZERO**

The cursor will move to the right, then the display will show:

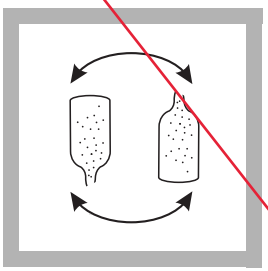
0.00 mg/L Cl2

Note: *If Reagent Blank Correction is on, the display may flash "limit". See Section 1.*



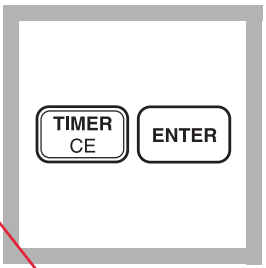
6. Fill a DPD Total Chlorine Reagent AccuVac Ampul with sample.

Note: *Keep the tip immersed while the ampule fills completely.*



7. Quickly invert the ampule several times to mix. Wipe off any liquid or fingerprints.

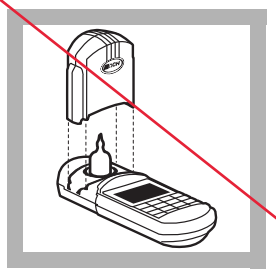
Note: *A pink color will form if chlorine is present.*



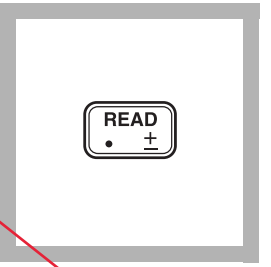
8. Press:

TIMER ENTER

A three-minute reaction period will begin.



9. When the timer beeps, place the AccuVac Ampul into the cell holder. Tightly cover the ampule with the instrument cap.



10. Press: **READ**

The cursor will move to the right, then the result in mg/L total chlorine will be displayed.

Note: *If the sample temporarily turns yellow after sample addition, or the display shows "limit", it is due to high chlorine levels. Dilute a fresh sample and repeat the test. A slight loss of chlorine may occur during dilution. Multiply the result by the appropriate dilution factor; see Section 1.*

Note: *Standard Adjust may be performed using a prepared standard (see Section 1).*

Sampling and Storage

Analyze samples for chlorine **immediately** after collection. Free chlorine is a strong oxidizing agent, and it is unstable in natural waters. It reacts rapidly with various inorganic compounds and more slowly oxidizes organic compounds. Many factors, including reactant concentrations, sunlight, pH, temperature and salinity influence decomposition of chlorine in water.

Avoid plastic containers since these may have a large chlorine demand. **Pretreat glass** sample containers to remove any chlorine demand by soaking in a dilute bleach solution (1 mL commercial bleach to l liter of deionized water) for at least 1 hour. Rinse thoroughly with deionized or distilled water. If sample containers are rinsed thoroughly with deionized or distilled water after use, only occasional pre-treatment is necessary.

Do not use the same sample cells for free and total chlorine. If trace iodide from the total chlorine reagent is carried over into the free chlorine determination, monochloramine will interfere. It is best to use separate, dedicated sample cells for free and total chlorine determinations.

A common error in testing for chlorine is introduced when a representative sample is not obtained. If sampling from a tap, let the water flow for at least 5 minutes to ensure a representative sample. Let the container overflow with the sample several times, then cap the sample containers so there is no headspace (air) above the sample. If sampling with a sample cell, rinse the cell several times with the sample, then carefully fill to the 10-mL mark. Perform the chlorine analysis immediately.

Accuracy Check

Standard Additions Method (using powder pillows)

a) Snap the top off a LR Chlorine PourRite Ampule Standard Solution.

b) Use a TenSette Pipet to add 0.1 mL of the standard to the reacted sample (this is the spiked sample). Swirl to mix.

c) Re-zero the instrument using the original sample (the blank).

d) Place the spiked sample into the cell holder and press **READ**. Record the results.

e) Calculate the concentration of mg/L chlorine added to the sample:

$$\text{mg/L chlorine added} = \frac{0.1\ (\text{vol. standard added}) \times \text{Label value (mg/L } Cl_2)}{10.1(\text{sample} + \text{standard volume})}$$

f) The spiked sample result (step d) should reflect the analyzed sample result + the calculated mg/L Cl_2 added (step e).

g) If this increase does not occur, see *Standard Additions* in *Section 1* for more information.

Standard Additions Method (using AccuVac Ampuls)

a) Snap the top off a LR Chlorine PourRite Ampule Standard Solution.

b) Use a graduated cylinder to measure 25 mL of sample into

each of two beakers.

c) Use a TenSette Pipet to add 0.2 mL of the standard to one of the beakers (this is the spiked sample). Swirl to mix.

d) Fill a DPD Total Chlorine AccuVac completely from each beaker.

e) Analyze the spiked and unspiked sample as described in
the procedure.

f) Calculate the concentration of mg/L chlorine added to the sample:

$$\text{mg/L chlorine added} = \frac{0.2\ (\text{vol. standard added}) \times \text{Label value (mg/L Chlorine)}}{25.2\ (\text{sample + standard volume})}$$

g) The spiked sample result should reflect the analyzed sample result + the calculated mg/L Cl_2 added (step f).

h) If this increase does not occur, see *Standard Additions* in *Section 1* for more information.

Method Performance

Precision

In a single laboratory, using a standard solution of 1.00 mg/L chlorine and two lots of reagents with the instrument, a single operator obtained standard deviations of ±0.01 mg/L chlorine.

In a single laboratory, using a standard solution of 1.00 mg/L chlorine and two representative lots of AccuVac Ampuls with the instrument, a single operator obtained a standard deviation of ±0.01 mg/L chlorine.

Estimated Detection Limit (EDL)

The estimated detection limit for programs 9 and 11 is 0.02 mg/L Cl_2. For more information on derivation and use of Hach's estimated detection limit, see *Section 1*.

Interferences

Interfering Substance	Interference Level and Treatment
Acidity	Greater than 150 mg/L $CaCO_3$. May not develop full color or color may fade instantly. Neutralize to pH 6-7 with 1 N sodium hydroxide. Determine amount to be added on separate sample aliquot, then add the same amount to the sample being tested. Correct for volume addition (See *Section 1, Correcting for Volume Additions*).
Alkalinity	Greater than 250 mg/L $CaCO_3$. May not develop full color or color may fade instantly. Neutralize to pH 6-7 with 1 N sulfuric acid. Determine amount to be added on separate sample aliquot, then add the same amount to the sample being tested. Correct for volume addition (See *Section 1*, *Correcting for Volume Additions*).
Bromine	Interferes at all levels
Chlorine Dioxide	Interferes at all levels
Chloramines, organic	May interfere
Hardness	No effect at less than 1,000 mg/L as $CaCO_3$
Iodine	Interferes at all levels
Manganese, Oxidized (Mn^{4+}, Mn^{7+}) or Chromium , Oxidized (Cr^{6+})	**1.** Adjust sample pH to 6-7. **2.** Add 3 drops potassium iodide (30 g/L) to a 25-mL sample. **3.** Mix and wait one minute. **4.** Add 3 drops sodium arsenite (5 g/L) and mix. **5.** Analyze 10 mL of the treated sample as described in the procedure. **6.** Subtract the result from this test from the original analysis to obtain the correct chlorine concentration.
Ozone	Interferes at all levels
Peroxides	May interfere
Extreme sample pH and highly buffered samples	Adjust to pH 6-7. See *Interferences, Section 1.*

Summary of Method

Chlorine can be present in water as free available chlorine and as combined available chlorine. Both forms can exist in the same water and be determined together as the total available chlorine. Free chlorine is present as hypochlorous acid and/or hypochlorite ion. Combined chlorine exists as monochloramine, dichloramine, nitrogen trichloride and other chloro derivatives.

The combined chlorine oxidizes iodide in the reagent to iodine. The iodine reacts with DPD (N, N-diethyl-p-phenylenediamine)

along with free chlorine present in the sample to form a red color which is proportional to the total chlorine concentration. To determine the concentration of combined chlorine, run free chlorine and total chlorine tests. Subtract the results of the free chlorine test from the results of the total chlorine test to obtain combined chlorine.

Pollution Prevention and Waste Management

Samples treated with sodium arsenite for manganese or chromium interferences will be hazardous wastes as regulated by Federal RCRA for arsenic (D004). See *Section 3* for more information on proper disposal of these materials.

REQUIRED REAGENTS & APPARATUS (USING POWDER PILLOWS)

Description	Qty/Test	Unit	Cat. No.
DPD Total Chlorine Reagent Powder Pillows	1 pillow	100/pkg	21056-69
Sample Cell, 10-20-25 mL, w/caps	2	6/pkg	24019-06

REQUIRED REAGENTS & APPARATUS (USING ACCUVAC AMPULS)

DPD Total Chlorine Reagent AccuVac Ampuls	1 ampul	25/pkg	25030-25
Beaker, 50 mL	1	each	500-41H

OPTIONAL REAGENTS

Description	Unit	Cat. No.
Chlorine Standard Solution, PourRite ampule, 25-30 mg/L Cl_2	20/pkg	26300-20
DPD Total Chlorine Reagent, SwifTest	250 tests	28024-00
Potassium Iodide Solution, 30 g/L	100 mL* MDB	343-32
Sodium Arsenite, 5 g/L	100 mL* MDB	1047-32
Sodium Hydroxide Standard Solution, 1 N	100 mL* MDB	1045-32
Sulfuric Acid Standard Solution, 1 N	100 mL* MDB	1270-32
Water, deionized	4 L	272-56

OPTIONAL APPARATUS

AccuVac Snapper Kit	each	24052-00
PourRite Ampule Breaker	each	24846-00
Cylinder, graduated, 25 mL	each	508-40
pH Indicator Paper, 1 to 11 pH units	5 rolls/pkg	391-33
pH Meter, *sens**ion***™*1*, portable	each	51700-00
Pipet, TenSette, 0.1 to 1.0 mL	each	19700-01
Pipet Tips, for 19700-01 TenSette Pipet	50/pkg	21856-96
Pipet Tips, for 19700-01 TenSette Pipet	1000/pkg	21856-28

For Technical Assistance, Price and Ordering

In the U.S.A.—Call 800-227-4224

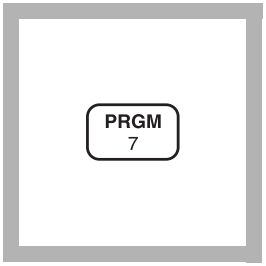
Outside the U.S.A.—Contact the Hach office or distributor serving you.

* Marked Dropper Bottle - contact Hach for larger sizes.

OXYGEN, DISSOLVED, High Range (0 to 15.0 mg/L O_2)

HRDO Method

For water and wastewater

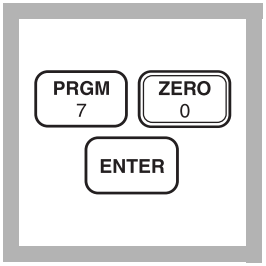


1. Enter the stored program number for dissolved oxygen, high range.

Press: **PRGM**

The display will show:

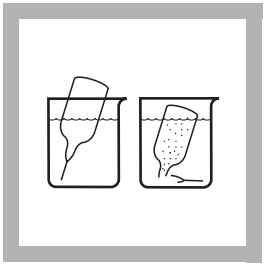
PRGM ?



2. Press: **70 ENTER**

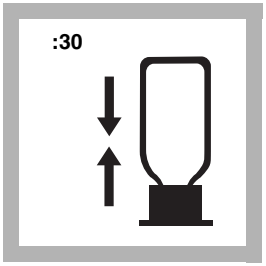
The display will show **mg/L, O2** and the **ZERO** icon.

3. Fill a sample cell (the blank) with at least 10 mL of sample. Fill a blue ampul cap with sample. Collect at least 40 mL of sample in a 50-mL beaker.



4. Fill a High Range Dissolved Oxygen AccuVac Ampul with sample.

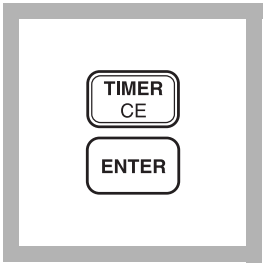
Note: *Keep the tip immersed while the ampul fills completely.*



5. Without inverting the ampul, immediately place the ampul cap that has been filled with sample securely over the tip of the ampul. Shake for about 30 seconds.

Note: *Accuracy is not affected by undissolved powder.*

Note: *The cap prevents contamination with atmospheric oxygen.*

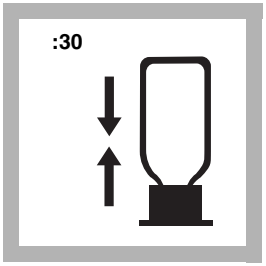


6. Press:

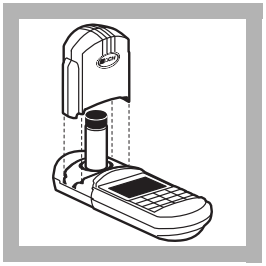
TIMER ENTER

A 2-minute reaction period will begin.

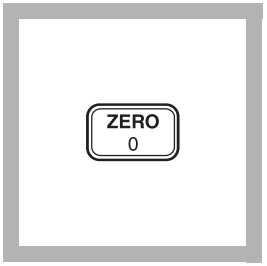
Note: *The two-minute period allows oxygen which was degassed during aspiration to redissolve in the sample and react.*



7. When the timer beeps, shake the ampul for 30 seconds.



8. Place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.

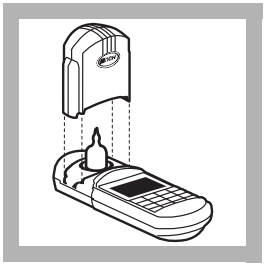


9. Press: **ZERO**

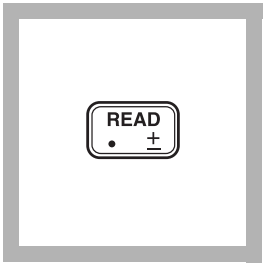
The cursor will move to the right, then the display will show:

0.0 mg/L O2

Note: *If Reagent Blank Correction is on, the display may flash "limit". See Section 1.*



10. Place the AccuVac ampul into the cell holder. Tightly cover the ampul with the instrument cap. Wait approximately 30 seconds for the air bubbles to disperse from the light path.



11. Press: **READ**

The cursor will move to the right, then the result in mg/L O_2 will be displayed.

Note: *Standard Adjust may be performed using a prepared standard (see Section 1).*

Sampling and Storage

The main consideration in sampling with the High Range Dissolved Oxygen AccuVac Ampul is to prevent the sample from becoming contaminated with atmospheric oxygen. This is accomplished by capping the ampul with an ampul cap in the interval between breaking open the ampul and reading the absorbance. If the ampul is securely capped, it should be safe from contamination for several hours. The absorbance will decrease by approximately 3% during the first hour and will not change significantly afterwards.

Sampling and sample handling are important considerations in obtaining meaningful results. The dissolved oxygen content of the water being tested can be expected to change with depth, turbulence, temperature, sludge deposits, light, microbial action, mixing, travel time and other factors. A single dissolved oxygen test rarely reflects the accurate over-all condition of a body of water. Several samples taken at different times, locations and depths are recommended for most reliable results. Samples must be tested immediately upon collection although only a small error results if the absorbance reading is taken several hours later.

Accuracy Check

The results of this procedure may be compared with the results of a dissolved oxygen meter (Cat. No. 51815-01).

Method Performance

Precision

In a single laboratory, using a standard solution of 8.0 mg/L O_2 determined by the Winkler method and two representative lots of reagent with the instrument, a single operator obtained a standard deviation of
±0.41 mg/L O_2.

Estimated Detection Limit

The estimated detection limit for program 70 is 0.10 mg/L O_2. For more information on the estimated detection limit, see *Section 1*.

Interferences

Interfering Substance	Interference Levels and Treatments
Cr^{3+}	Greater than 10 mg/L
Cu^{2+}	Greater than 10 mg/L
Fe^{2+}	Greater than 10 mg/L
Mg^{2+}	Magnesium is commonly present in seawater and causes a negative interference. If the sample contains more than 50% seawater, the oxygen concentration obtained by this method will be 25% less than the true oxygen concentration. If the sample contains less than 50% seawater, the interference will be less than 5%.
Mn^{2+}	Greater than 10 mg/L
Ni^{2+}	Greater than 10 mg/L
NO_2^-	Greater than 10 mg/L

Summary of Method

The High Range Dissolved Oxygen AccuVac Ampul contains reagent vacuum sealed in a 12-mL ampul. When the AccuVac ampul is broken open in a sample containing dissolved oxygen, a yellow color forms, which turns purple as the oxygen reacts with the reagent. The color developed is proportional to the concentration of dissolved oxygen.

REQUIRED REAGENTS

Description	Quantity Required Per Test	Unit	Cat. No.
High Range Dissolved Oxygen AccuVac Ampuls, with 2 reusable ampul caps	1 ampul	25/pkg	25150-25

REQUIRED APPARATUS

Beaker, 50 mL	1	each	500-41H
Caps, ampul, blue	varies	25/pkg	1731-25
Sample Cell, 10-20-25 mL, w/ cap	1	6/pkg	24019-06

OPTIONAL REAGENTS AND APPARATUS

AccuVac Dissolved Oxygen Sampler	each	24051-00
AccuVac Snapper Kit	each	24052-00
AccuVac Drainer	each	41036-00
BOD bottle and stopper, 300 mL	each	621-00
Dissolved Oxygen Meter, Portable HQ 10	each	51815-01
Dissolved Oxygen Reagent Set (Buret Method)	100 tests	23514-00
Dissolved Oxygen Reagent Set (Digital Titrator Method)	50 tests	22722-00

Dissolved oxygen may also be determined by titrimetric methods. Request Publication 8042 for additional information.

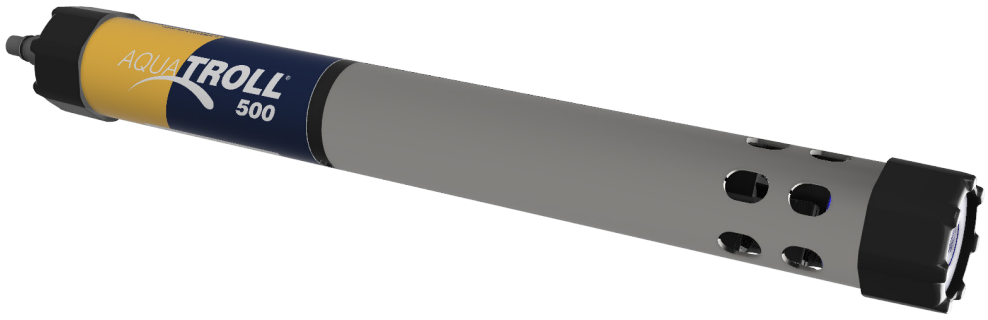
For Technical Assistance, Price and Ordering

In the U.S.A.—Call 800-227-4224

Outside the U.S.A.—Contact the Hach office or distributor serving you.

Aqua TROLL 500

Operator's Manual



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Serial Number Location

The instrument serial number is on the product label affixed to the instrument body. Serial numbers for individual sensors are engraved on the sensor body.

Unpacking and Inspection

Your equipment was carefully inspected before shipping. Check the equipment for any physical damage sustained during shipment. Notify In-Situ and file a claim with the carrier if there is any such damage; do not attempt to deploy or operate the instrument.

Save packing materials for future storage and shipping of your equipment.

Obtaining Repair Service

If you suspect your system is malfunctioning and repair is needed, you can help assure efficient servicing by following these guidelines:

1. Call or email In-Situ Technical Support. Have the product model and serial number available.
2. Be prepared to describe the problem, including how the product was used and the conditions noted at the time of the malfunction.
3. If Technical Support determines that service is needed, they will ask your company to fill out the RMA form and pre-approve a specified monetary amount for repair charges. When the form and pre-approval is received,
4. Technical Support will assign an RMA (Return Material Authorization) number.
5. Clean the product as described in the manual.
6. If the product contains a removable battery, remove and retain it unless you are returning the system for a refund or Technical Support states otherwise.
7. Carefully pack your product in its original shipping box, if possible.
8. Mark the RMA number clearly on the outside of the box.
9. Send the package, shipping prepaid, to:

In-Situ
ATTN: Repairs
221 East Lincoln Avenue
Fort Collins, CO 80524
The warranty does not cover damage during transit. In-Situ recommends insurance for all shipments. Warranty repairs will be shipped back prepaid.

Outside the U.S.
Contact your international In-Situ distributor for repair and service information.

Guidelines for Cleaning Returned Equipment

Please help us protect the health and safety of our employees by cleaning and decontaminating equipment that has been subjected to potential biological or health hazards, and labeling such equipment. Unfortunately, we cannot service your equipment without such notification. Please complete and sign the form on page 12 (or a similar statement certifying that the equipment has been cleaned and decontaminated) and send it to us with each instrument.

- We recommend the glassware cleaning product, Alconox, available from In-Situ and from laboratory supply companies.
- Clean all cables and remove all foreign matter.
- Clean the cable connectors with a clean, dry cloth. Do not submerge the connectors.
- Clean the instrument including the nosecone, cable head, and protective caps.

If an instrument is returned to our Service Center for repair or recalibration without a statement that it has been cleaned and decontaminated, or if it is the opinion of our Service Representatives that the equipment presents a potential health or biological hazard, we reserve the right to withhold service until proper certification is obtained.

Decontamination & Cleaning Statement

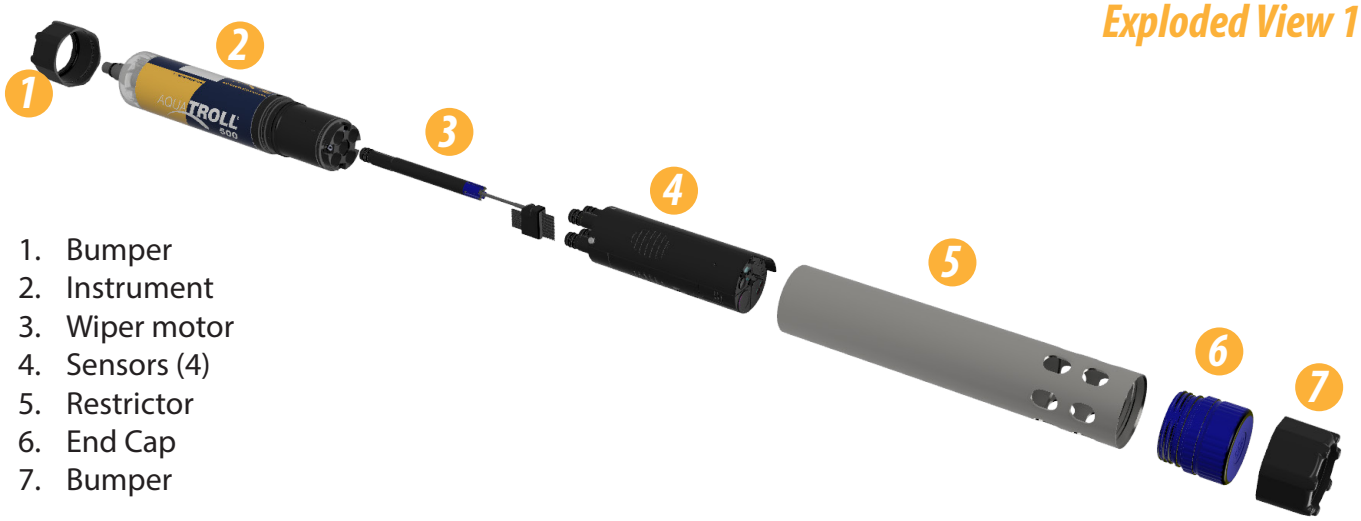
Company Name		Phone
Address		
City	State	
Instrument Type		Serial Number
Contaminant(s) if known)		
Decontamination procedure(s) used		
Cleaning verified by		Title
Date		

Safety

- Do not submerge the Wireless TROLL Com or your mobile device in liquid.
- Ensure that sensors, or sensor plugs, are completely inserted into the ports, so that no liquid can enter the instrument.
- Ensure that the RDO Sensor Cap is pressed firmly over the sensor lens and is flush with the instrument before submerging in liquid.
- Replace the cable if insulation or connectors are damaged.
- Make sure the probe and sensor O-rings are clean and free of damage.

Instrument Components

Exploded View 1



1. Bumper
2. Instrument
3. Wiper motor
4. Sensors (4)
5. Restrictor
6. End Cap
7. Bumper

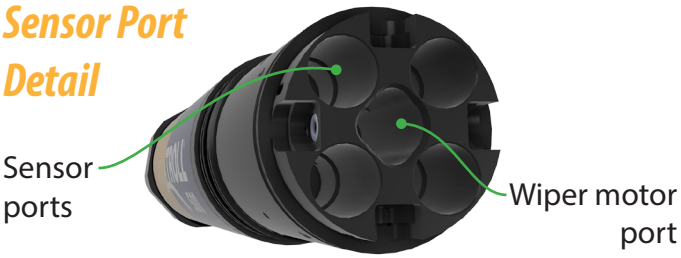
Exploded View 2

8. Bulkhead connector

End View

Flat edge of connector aligns with flat edge of Rugged Cable.

Sensor Port Detail



Required Accessories

Communication Device

You will need a communication device to calibrate, configure and deploy the Aqua TROLL 500.

Wireless TROLL Com

Provides power to the Aqua TROLL 500.

Configure and deploy with a Bluetooth-endabled Android device.

Connects the Aqua TROLL 500 to a PC via USB or Bluetooth.

Cable

Rugged Twist-Lock Cable

Connects the Aqua TROLL 500 to a Wireless TROLL Com, USB TROLL Com or Cube/Tube.

Vented or non-vented.

Sensors

Available Sensors

1. Temperature
2. Conductivity/temperature
3. pH/ORP
4. RDO
5. Turbidity
6. Ammonium
7. Chloride
8. Nitrate
9. Chlorophyll a
10. BGA-PC
11. BGA-PE
12. Rhodamine WT

Software

Win-Situ 5 Software for PC

Calibrate, configure and take readings with the Aqua TROLL 500 from a PC.

VuSitu Mobile App

Calibrate, configure and deploy the Aqua TROLL 500 from a Bluetooth-enabled Android device.

Download it from www.in-situ.com.

Get it at play.google.com.

Telemetry

Tube 300

Power Aqua TROLL 500 in remote-monitoring applications

Send data to HydroVu or another FTP server.

Cube 300

Power up to five instruments in remote-monitoring applications

Send data to HydroVu or another FTP server.

* Cubes and Tubes are available in battery or solar-powered options.

Instrument Dimensions

LCD Screen

View instrument status and access settings via the LCD screen. The sonde must be connected to a Wireless TROLL Com or other power source.

Accessing the LCD Menu

LCD screen will display sensor status on activation.

Hold instrument horizontally and slowly tap Aqua TROLL 500 logo 3-4 times to view the main menu.

Tilt instrument left or right to scroll through menu options.

Select an item when its background turns black by tapping the instrument once.

You can enable Bluetooth communication directly with the sonde via the Bluetooth menu option.

Possible Port Statuses

Sensors installed

Port plugs installed

Sensor/port error

Possible Power Statuses

9.0v ✓ Power level within specs

8.2v ! Power level NOT within specs

Possible Connected Statuses

Connected via Bluetooth

Connected via cable

Error Messages

Install All Sensors! Port(s) empty

RDO Cap expired! Cap expiration

System Components

Base Unit Components	Part Number
RDO Sensor	0063450
Combination pH/ORP Sensor	0063470
Turbidity	0063480
Combination Conductivity/Temperature Sensor or standalone Temperature Sensor	0063460, 0063490
Ammonium Sensor	0033700
Chloride Sensor	0033720
Nitrate Sensor	0033710
Chlorophyll a Sensor	0038900
BGA-PC Sensor	0038920
BGA-PE Sensor	0038930
Rhodamine WT Sensor	0038890
Dual Stainless Titanium Storage Chamber	0079880
Sensor Port Plug	0063510
Rubber Bumpers (2)	0079880
Wiper or Wiper Port Plug	0063500, 0064630
Accessories purchased separately	
Wireless TROLL Com for Android	0031240
Rugged Android Tablet	0064860
Cable	
Stripped-and-tinned Cable with male connector	0053310
Twist-Lock Bulkhead Connector	0053240
Cable Extender	0051490
Large Desiccant (titanium connector)	0051810
Large Desiccant (ABS connector)	0053550

Small Desiccant (3 pack) - storage desiccant	0052230
Desiccant Refill Kit for Large or Outboard Desiccant	0029140

Calibration and Maintenance

RDO X Cap Replacement Kit	0079790
RDO Fast Cap	0066800
pH/ORP & ISE Replacement Reference Junction Kit	0078990
Wiper Brush Kit	0079810
Maintenance Kit	0078940
Copper Antifouing Guard	0076100
Quick-Cal Solution for calibrating DO , Conductivity, pH and ORP	0033250
Dissolved Oxygen Calibration Kit	0032110
DO Field Calibration Kit	0080830
Conductivity Calibration Kit (Full)	0032090
Conductivity Calibration Kit (Low)	0032630
Conductivity Calibration Kit (High)	0032640
pH Calibration Kit	0032080
pH/ORP Calibration Kit	0032120
pH & ISE Storage Solution	0065370
Individual Calibration Solutions	See website
Ammonium Calibration Kit (includes 1 liter each: 14 ppm, 140 ppm, 1400 ppm, DI water)	0032140
Chloride Calibration Kit (includes 1 liter each: 35.5ppm, 355 ppm, 3545 ppm, DI water)	0032150
Nitrate Calibration Kit (includes 1 liter each: 14 ppm, 140 ppm, 1400 ppm, DI water)	0032130

Spot Checking Configuration

Take live readings with an Aqua TROLL 500, Rugged Cable, Wireless TROLL Com and a Bluetooth-enabled Android device.

Wireless TROLL Com

Powers the Aqua TROLL 500 during live readings.

Communicates with the VuSitu mobile app via Bluetooth.

Rugged Cable

Connects the Wireless TROLL Com to the instrument.

Aqua TROLL 500

Takes live readings and transfers data to the Wireless TROLL Com via the Rugged Cable.

Getting Started (Spot-Checking)

Follow the steps below to set up and deploy the Aqua TROLL 500 when you intend to take live readings. See the next page for information about setting up and using the instrument in remote-monitoring applications.

1 Unpack instrument.

Remove sonde, sensors and maintenance supplies from box.

2 Install RDO cap and pH/ORP sensor.

a. If your instrument includes a pH/ORP sensor, you'll need to install it prior to calibration and deployment.
b. Install the RDO cap on the RDO sensor.

3 Download and install software.

- PC users visit www.in-situ.com
- Mobile device users: play.google.com

4 Connect instrument to TROLL Com.

a. Attach the Rugged Cable to the TROLL Com and Aqua TROLL 500.
b. Press power button on TROLL Com and pair with the VuSitu mobile app.

5 Calibrate.

Perform a single or multi-point calibration.

6 Configure the instrument and take readings.

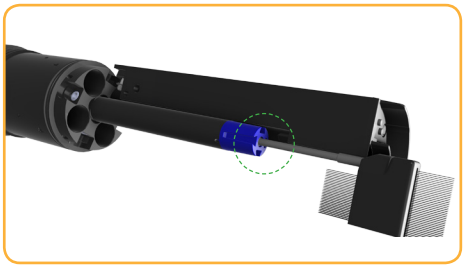
a. Create a site in VuSitu.
b. Take readings in VuSitu's Snapshot or Live Readings mode.
c. Save readings and share via email, SMS or cloud storage.

Installing Wiper Motor and Sensors

Remove restrictor.

Install wiper motor.

Install sensors in any order.



Align sensor with interlock groove in wiper motor.

Tighten set-screw at base of each sensor.

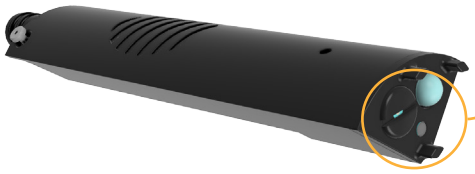
Unscrew end cap from restrictor.

Flip restrictor and install with restrictor holes near center of instrument for calibration.

Flip restrictor and replace end cap before deployment.

Handling pH and Ion-Selective Electrode Sensors (ISEs)

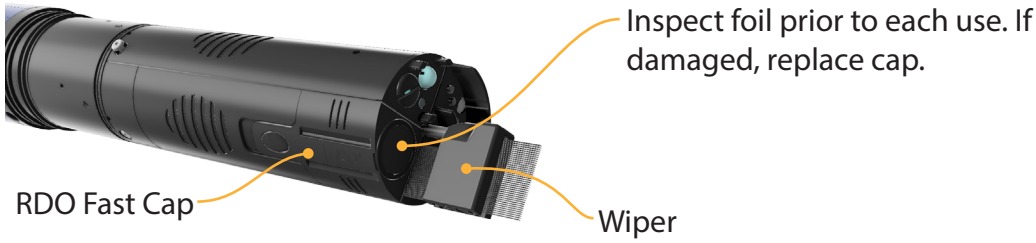
Salt may accumulate around the reference junctions of the ammonium, chloride, nitrate and pH sensors. Rinse with deionized water to remove any buildup.



Before using the **ISE sensors** for the first time, replace the reference filling solution. Condition the sensors by soaking in calibration standard for 4-24 hours prior to deployment. This step is not necessary for the pH sensor.

Using the RDO Sensor and RDO Fast Cap

The wiper can severely reduce the life of the RDO Fast Cap. Wear will vary by application. Verify sensor performance prior to use and replace the Fast Cap if damaged.



Connecting the TROLL Com

You must connect the Aqua TROLL 500 to a Wireless TROLL Com to calibrate the instrument, configure or take live readings.

Attach Rugged Cable to the Wireless TROLL Com.

Attach opposite end of cable to the Aqua TROLL 500.

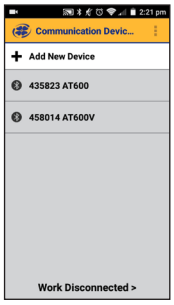
Press power button.

Pairing the Instrument with the VuSitu Mobile App

Download and install the VuSitu mobile app from the Google Play store. Visit play.google.com on your Android device.

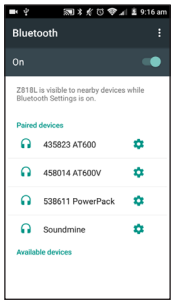
Turn on the Wireless TROLL Com and open VuSitu mobile app.

Select **Choose or Add a Device**.

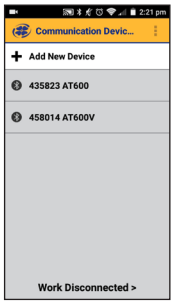


Select **Add New Device** when connecting for the first time.

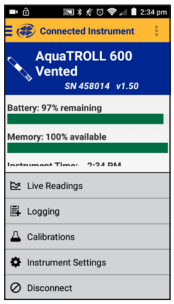
Locate the serial number under the yellow lid on the Wireless TROLL Com.



From device's Bluetooth Settings screen, tap serial number of Wireless TROLL COM.



Tap mobile device's back button and tap serial number from list.

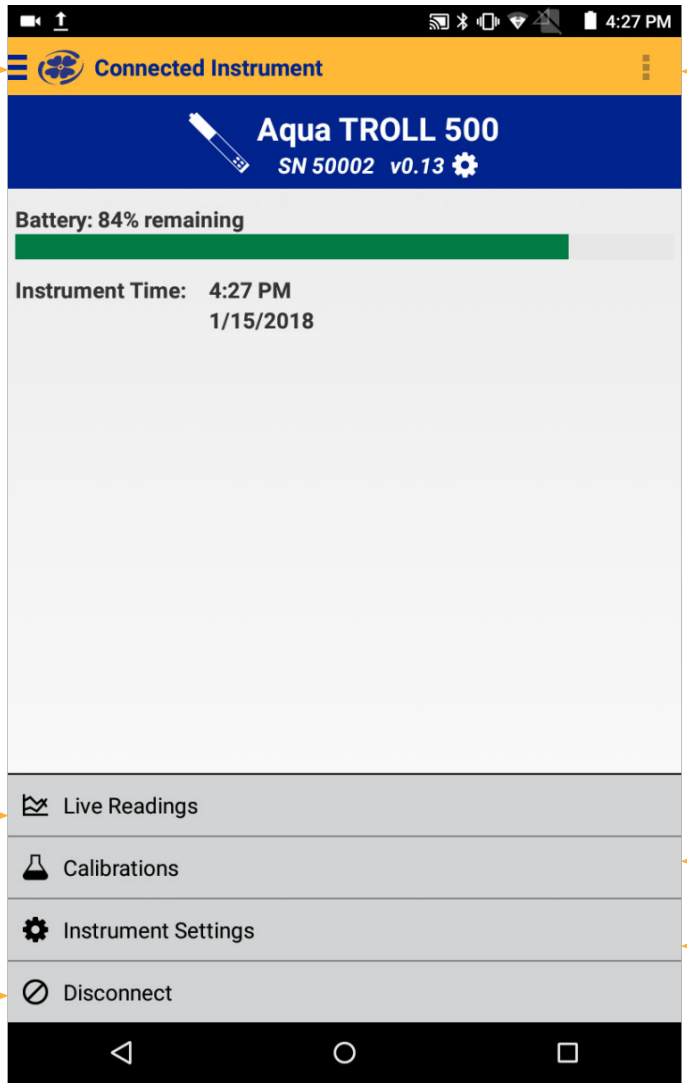


Tap mobile device's **Back** button to view Connected Instrument screen.

Navigating VuSitu

After pairing a Wireless TROLL Com with VuSitu, the app will always display the Connected Instrument screen at launch. You can access all features of the app from this screen.

Connected Instrument Screen



Access menu.

Access help information.

Take single readings or continuously record at two-second intervals.

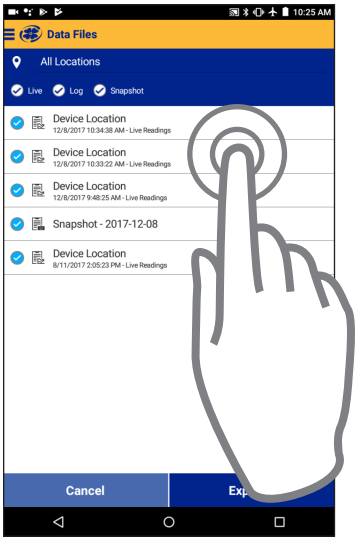
Calibrate sensors.

Disconnect app from instrument.

Access instrument clock and telemetry settings.

Selecting with Long-press and Swipe

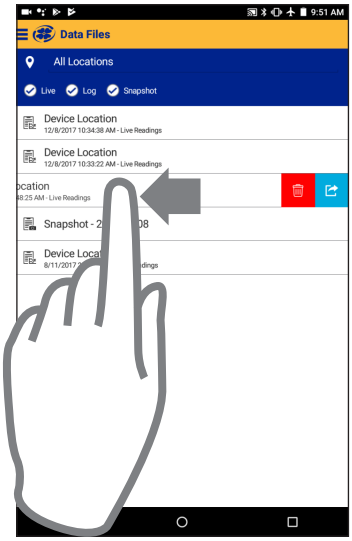
Long-Press



Press and hold any of the items in a list of files.

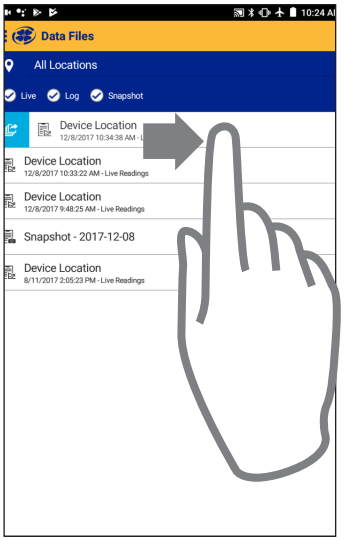
You can now select two or more items.

Swipe Left



Press an item and swipe left to reveal the delete and sharing icons.

Swipe Right



Press any item in a list and swipe right to reveal the sharing icon.

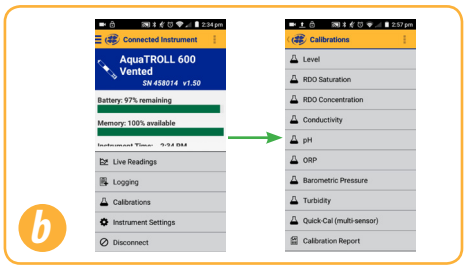
Calibrating the Sensors

Solution-based calibration

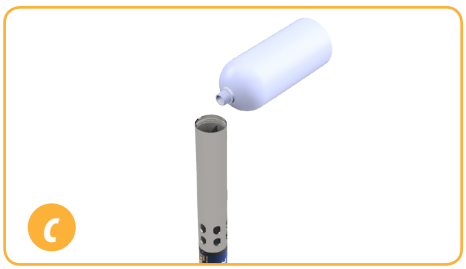
Use the solution-based procedure described below to calibrate all sensors except RDO. You will need the following items.

- Calibration standard, or multiple standards for multi-point calibrations
- Wireless TROLL Com connected to the Aqua TROLL 500
- Bluetooth-enabled Android device

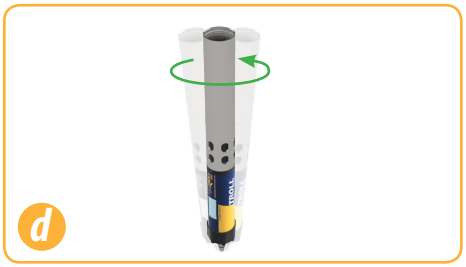
Connect the sonde to a Wireless TROLL Com and pair with VuSitu.



In VuSitu, click Calibrations from the Connected Instrument screen and choose sensor to calibrate.



Remove cap from instrument and pour 10-20 ml of DI water into restrictor.



Gently shake the sonde in a circular motion to rinse the inside of restrictor and sensors.

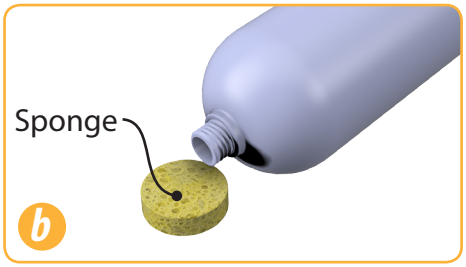
Discard the DI water and repeat rinsing procedure two more times with 10-20 ml of your first calibration standard.

Follow the instructions in VuSitu to perform the calibration.

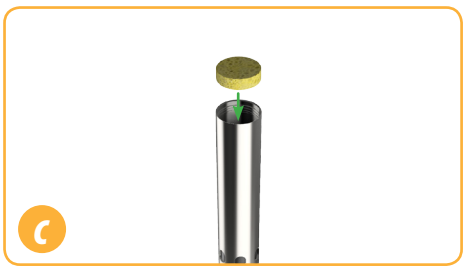
RDO 100% Saturation Calibration: Water Saturated Air

Use the procedure below to calibrate the Aqua TROLL 500 RDO sensor, or see the next section for an alternative method.

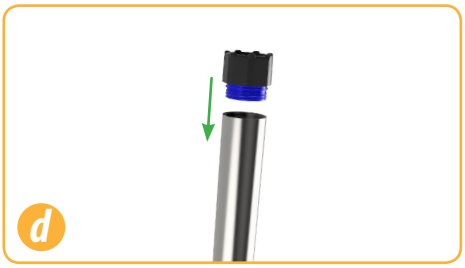
Place the restrictor in calibration mode (holes near center of instrument).



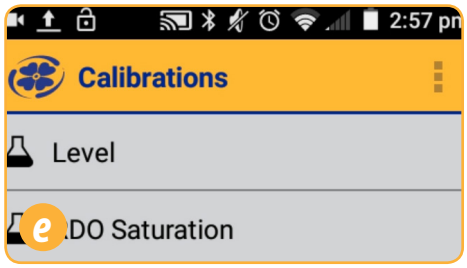
Saturate a small sponge with water.



Place sponge in restrictor.

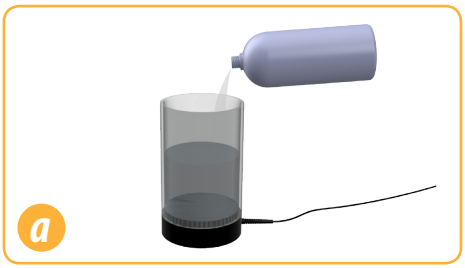


Reinstall the end cap and leave sponge in restrictor for five minutes.



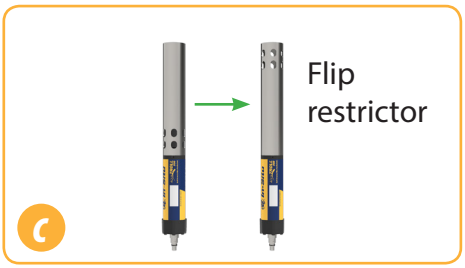
Follow the instructions in VuSitu to finish calibration.

RDO 100% Saturation Calibration: Saturation Bubbler



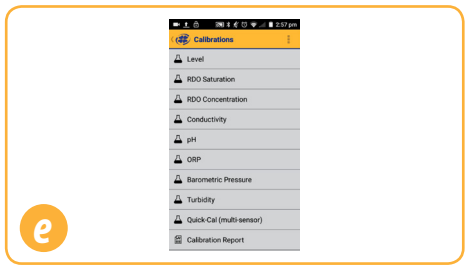
Fill a 100% saturation bubbler two-thirds with tap water.

Turn on bubbler and allow 5-10 minutes for 100% saturation.

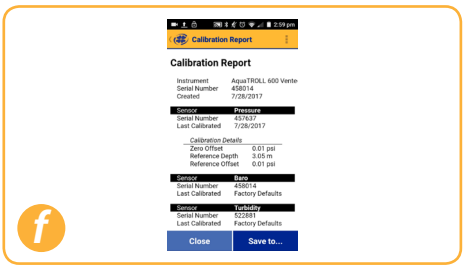


Put sonde into deployment mode by flipping restrictor 180 degrees.

Place sonde into bubbler.



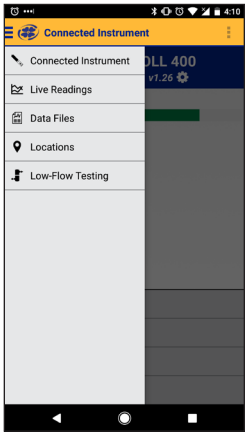
Open the VuSitu mobile app and tap Calibrations > RDO Saturation.



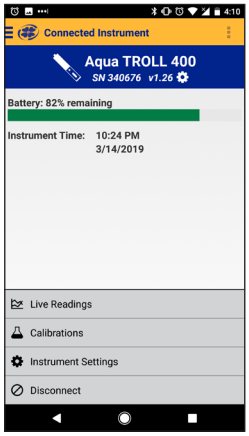
Follow instructions in VuSitu to finish calibration.

RDO Salinity Setting

The Aqua TROLL 500 includes automatic salinity compensation. This feature requires a conductivity sensor and RDO sensor. With both sensors installed, the sonde will use salinity compensation by default. To change the compensation value, follow these steps:

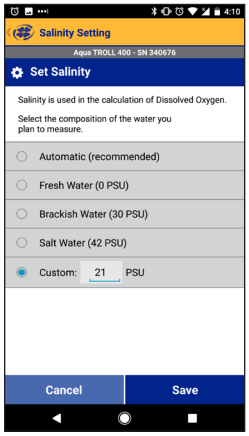


From VuSitu's main menu, select **Connected Instrument**.



Select **Instrument Settings** from the menu at the bottom of the screen.

From the Instrument Settings menu, select **Salinity Setting**.

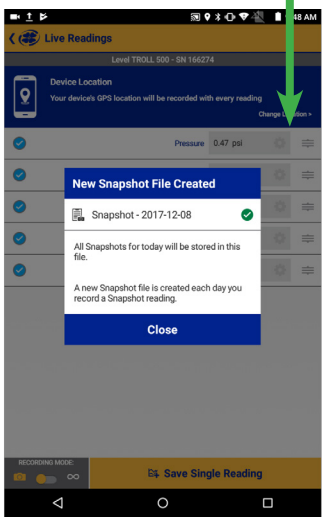


Enter your desired salinity compensation setting and press **Save**.

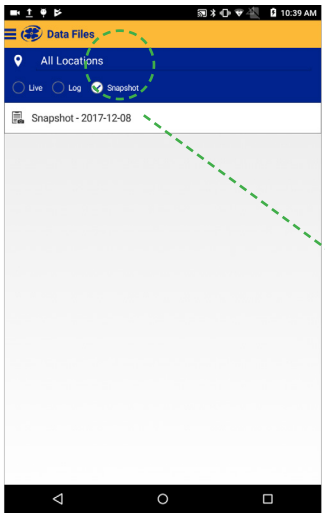
Live Readings in VuSitu

To take live readings with the Aqua TROLL 500 and VuSitu mobile app, the sonde must be connected to a Wireless TROLL Com.

Snapshot Mode

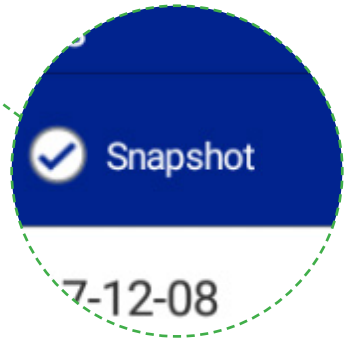


Take a single reading and save to Snapshot file.

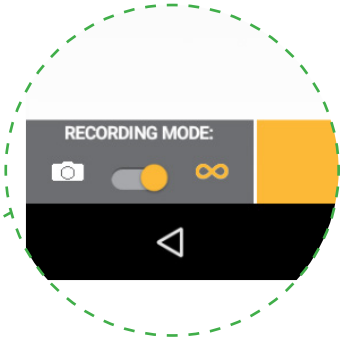


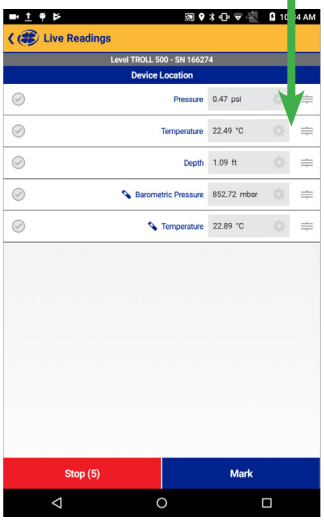
View Snapshot file from Menu > Data Files.

Check Snapshot option.

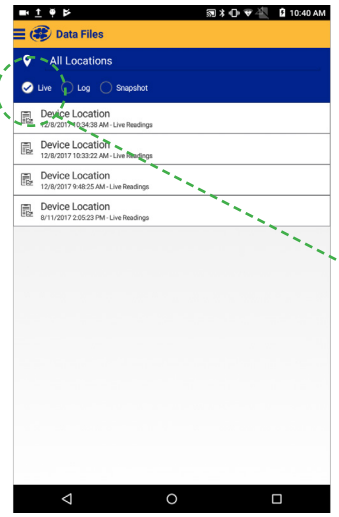


Live Readings Mode





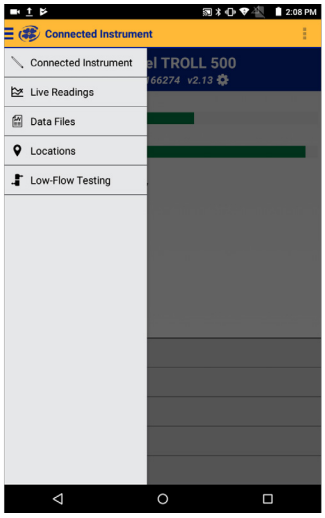
Take readings at two-second intervals.



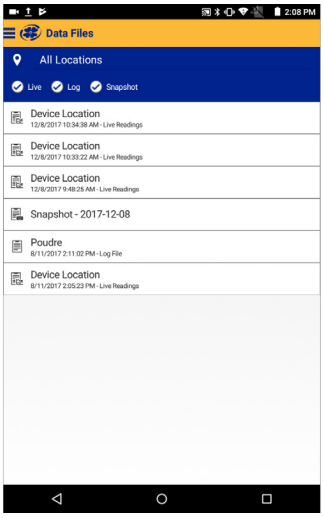
View file from Menu > Data Files.

Check Live option.

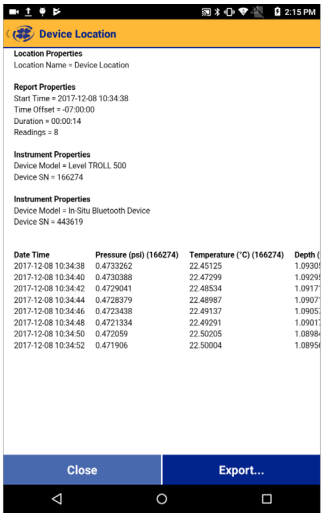
Exporting Data Files



Use the menu at the top left to access the Data Files screen.

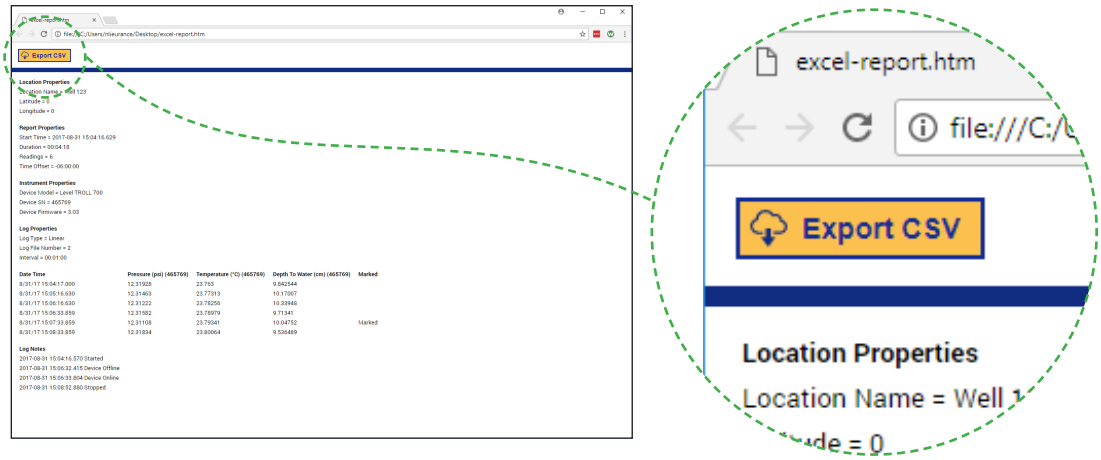


Tap one of the files to view and export.

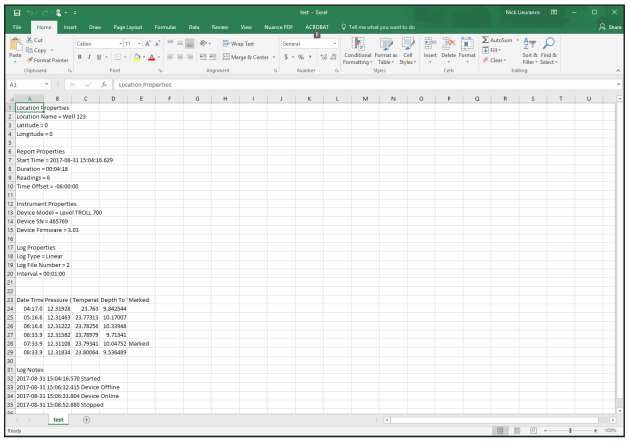


Tap **Export** to save the file and choose how you wish to share it.

Viewing Data Files



Open a VuSitu data file in any web browser. Click the button at the top left to generate a CSV.



Remote-Monitoring Configuration (Telemetry)

Tube 300
Provides power to the Aqua TROLL 500 and uploads data to a server via FTP

Use ANT Tool software to setup data transfer before deployment

Rugged Cable
Connects Tube to a down-well instrument

Aqua TROLL 500
Monitors water quality parameters during deployment.

Getting Started (Remote Monitoring)

1 Unpack instrument.

Remove sonde, sensors and maintenance supplies from box.

2 Install RDO cap and pH/ORP sensor.

a. If your instrument includes a pH/ORP sensor, you'll need to install it prior to calibration and deployment.
b. Install the RDO cap on the RDO sensor.

3 Download and install software.

- PC users visit www.in-situ.com to download Win-Situ 5 and the ANT Tube/Cube Tool
- Mobile device users: play.google.com

4 Connect instrument to TROLL Com.

a. Connect the Aqua TROLL 500 to a Wireless TROLL Com with a Rugged Cable.
b. Press the power button on the Wireless TROLL Com.

5 Calibrate.

Perform a single or multi-point calibration.

6 Configure.

See instructions on the next page to configure the telemetry device.

7 Configure the Tube/Cube.

Use the ANT Cube/Tube tool to set alarms and FTP information.

8 Deploy.

Place the instrument in the deployment location.

Configuring the Cube/Tube

Before deploying the Aqua TROLL 500 in a remote-monitoring application, configure the Tube/Cube and the sonde.

1 Download and install the ANT Tool.

Visit www.in-situ.com/software and download the ANT Tube/Cube Tool.

2 Connect the Aqua TROLL 500 to your PC.

Connect the Cube/Tube to a PC with the setup cable.

3 Configure Cube/Tube options.

Use the ANT Tool to configure alarms and FTP information.

4 Deploy the instrument.

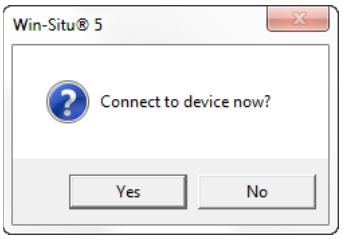
Connect Cube/Tube to the instrument with a Rugged Cable.
Place the tube and instrument in the deployment location.

Connecting to Win-Situ on a PC

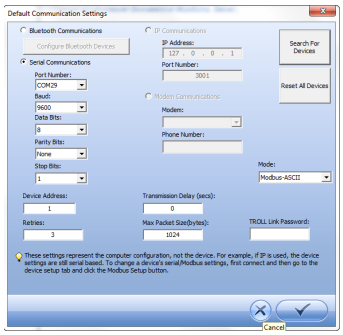
Connecting to Win-Situ via USB

Download and install Win-Situ by visiting www.in-situ.com. The Wireless TROLL Com must be connected to the sonde and powered on to connect the instrument to Win-Situ.

You can connect a Wireless TROLL Com to a PC with the included USB cable. Plug the cable into the port at the top of the TROLL Com and the USB port on your PC.

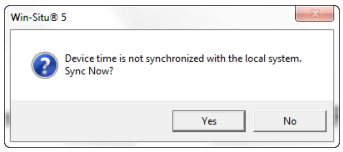


Open Win-Situ. Select **No** when asked to connect now.



Click Preferences > Com Settings from menu bar and choose correct com port. Select Serial Communications button. Click check mark button.

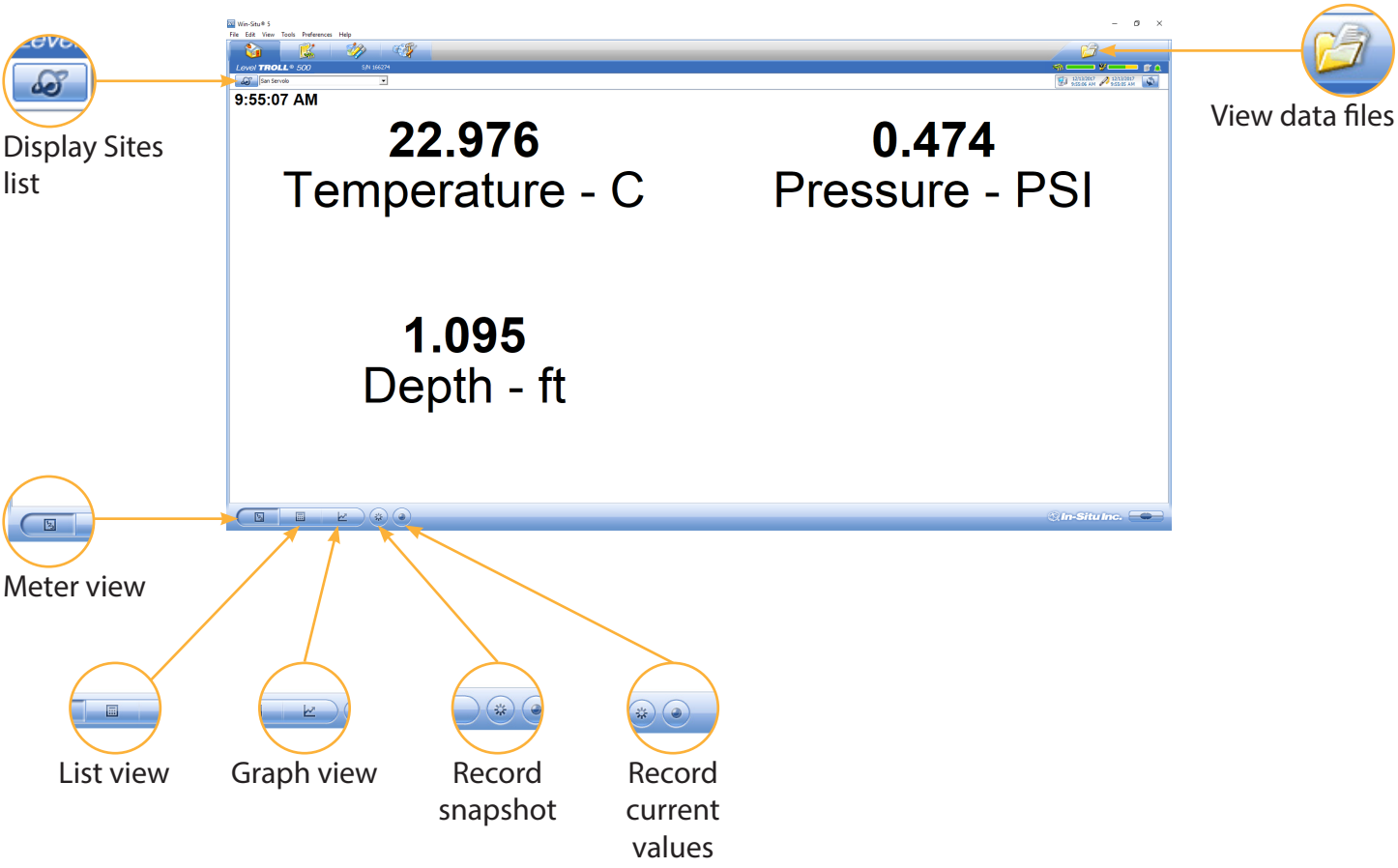
Click the yellow connect button at the bottom right of the screen.



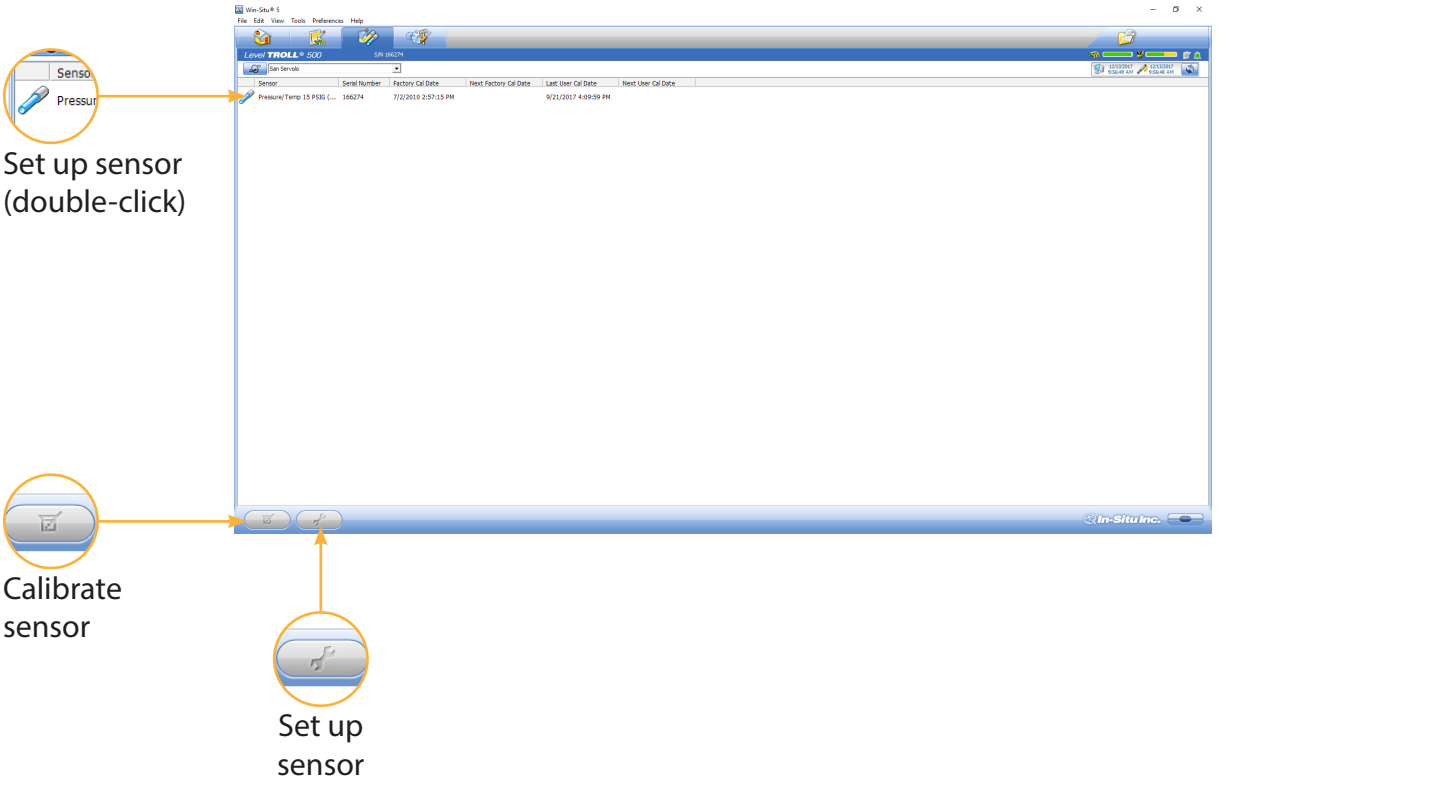
Click Yes if prompted to sync device time with local system.

Navigating the Win-Situ Interface

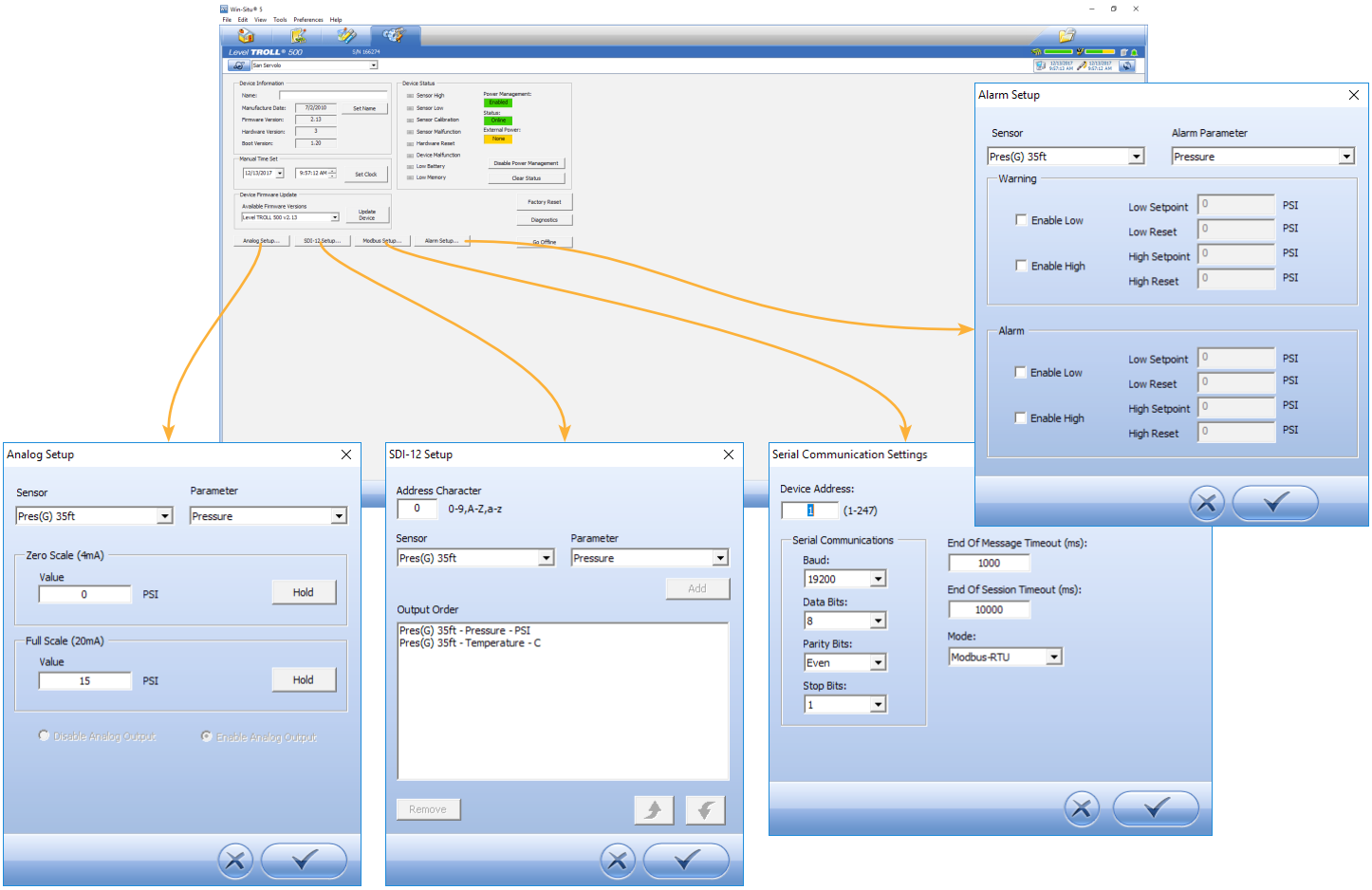
Home Tab



Sensor Tab

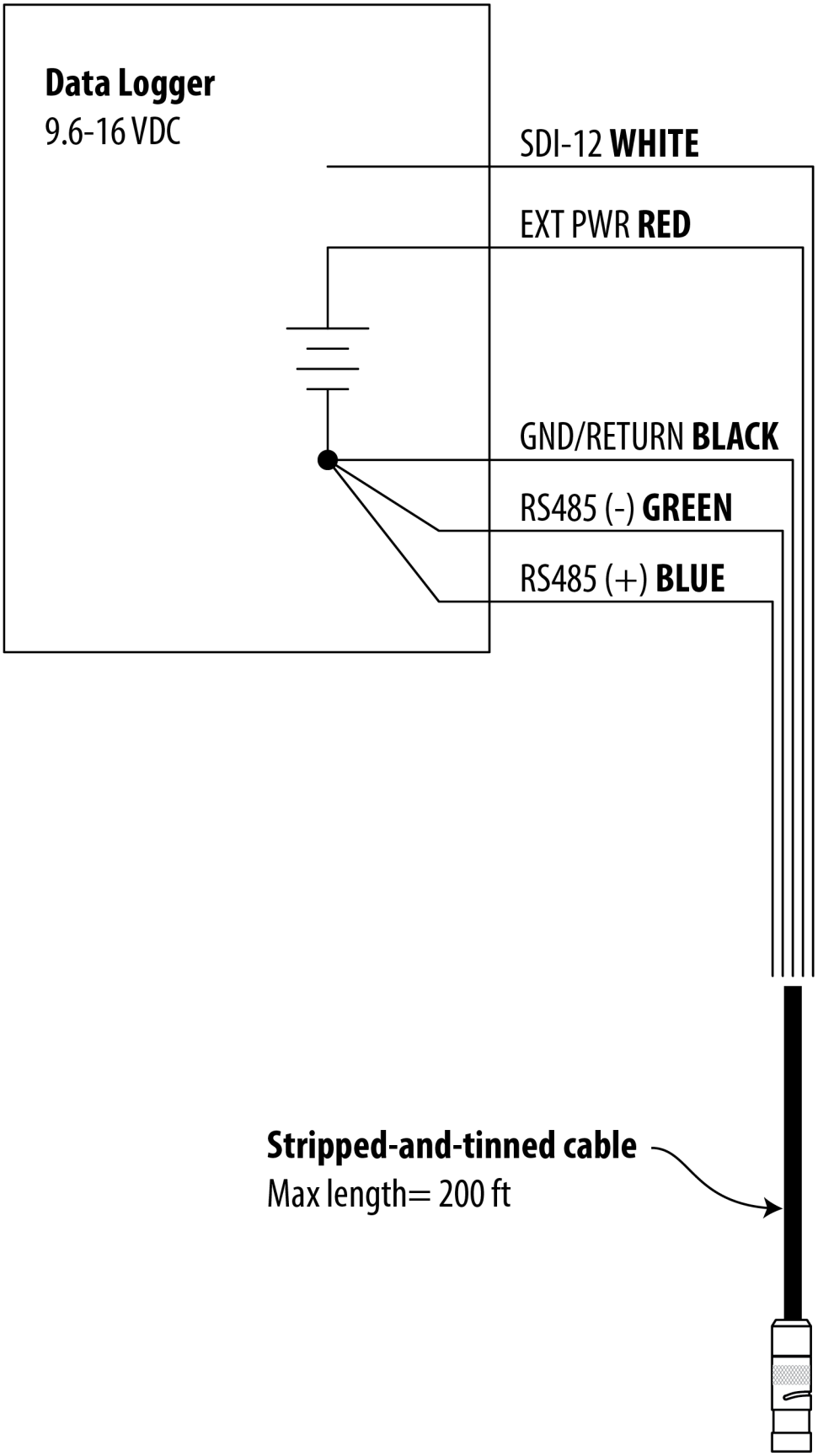


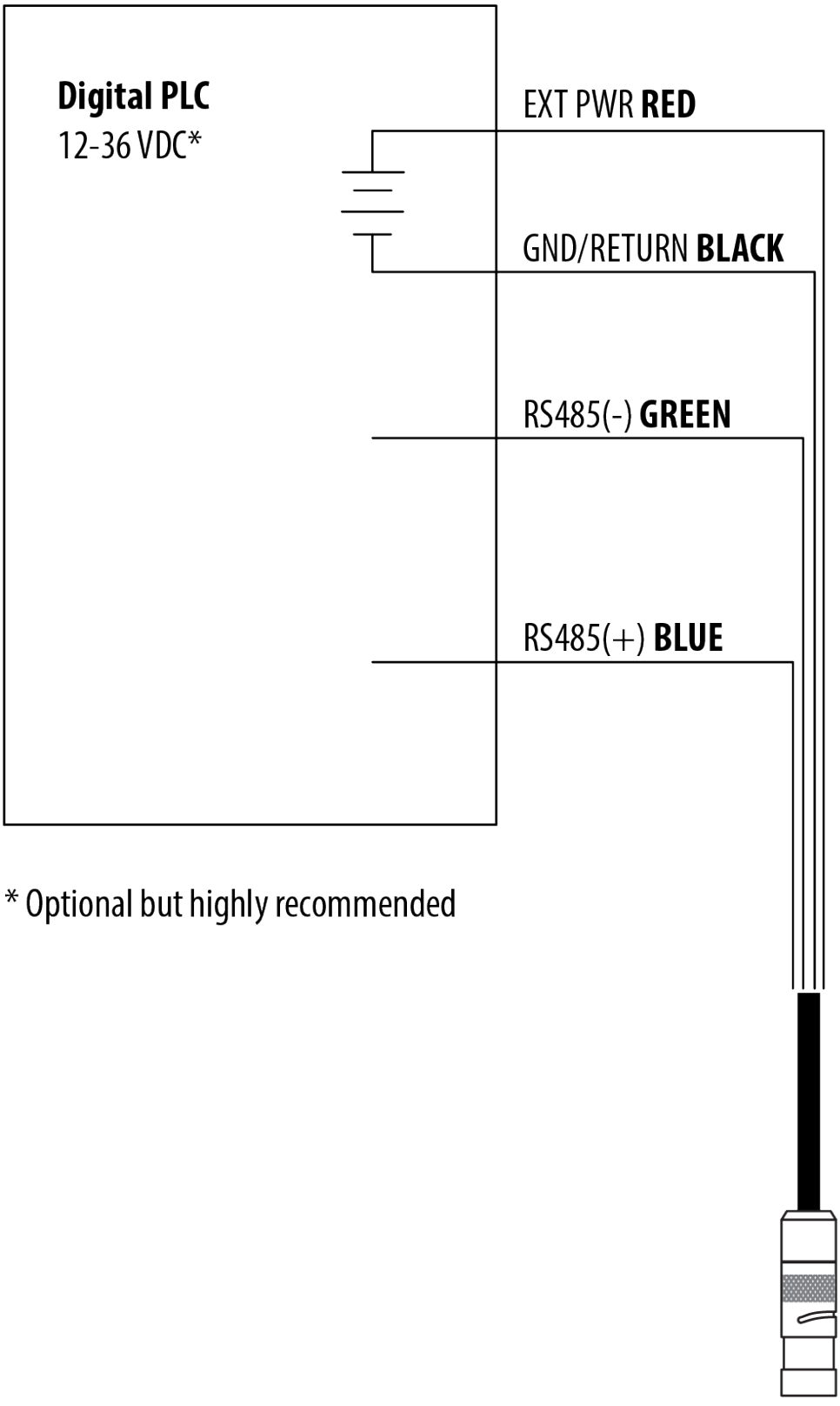
Device Setup Tab



Connecting the Aqua TROLL 500 to a PLC or Data Logger

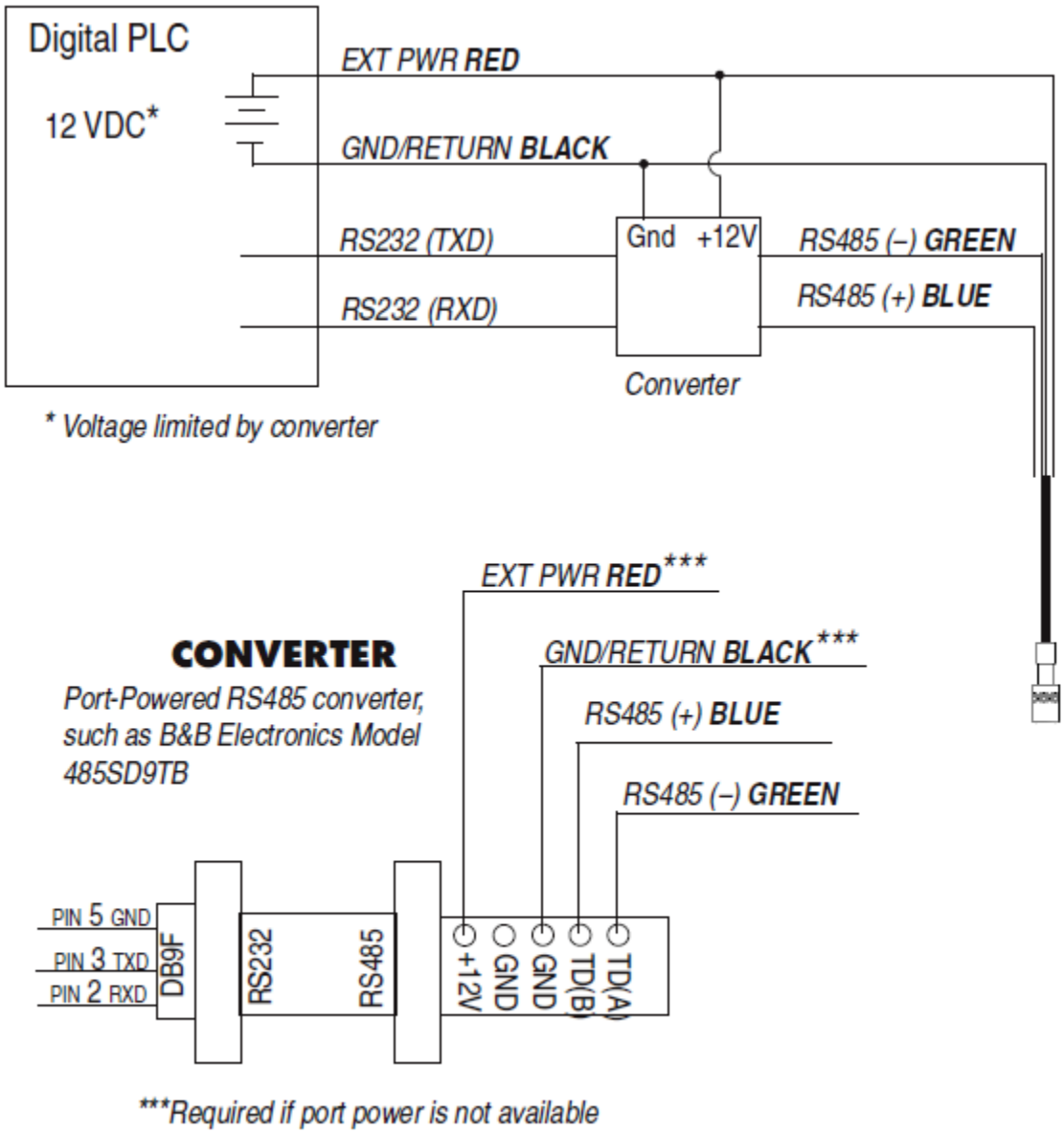
SDI-12 3 Wire





* Optional but highly recommended

Modbus Master with RS232 (Converter Required)



Modbus PLC Interface

Overview

The Modbus PLC Interface is a simplified method of communicating with the Aqua TROLL 500 using the Modbus protocol. It reduces programming complexity and allows the user to remove sensors and reinstall them in different ports. Please observe the following limitations when using this interface:

- Only one sensor of any sensor model can be used in the sonde (for example: only one turbidity sensor can be installed).
- If a parameter is provided by more than one of the installed sensors, the interface will return the first value available.
- Firmware version 1.71 or later must be installed on the sonde.

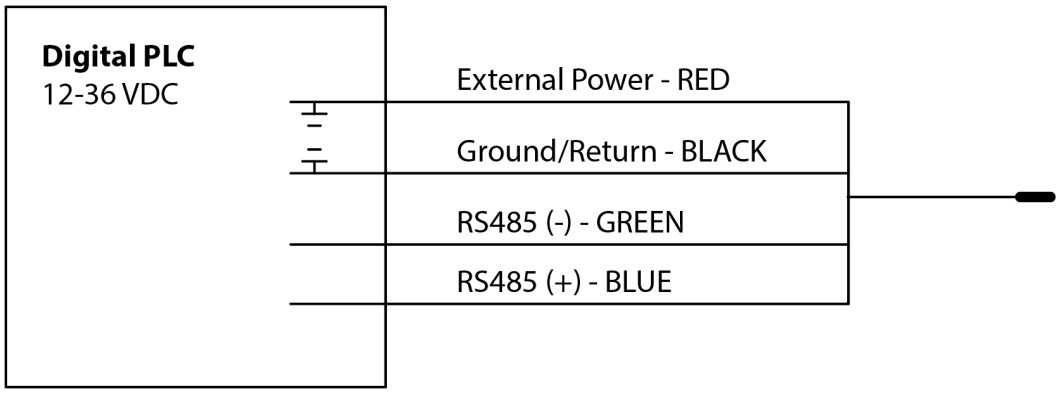
For information about the full Modbus capabilities of your sonde, see the Aqua TROLL 500/600 Interface Specification at www.in-situ.com/support/type/documentation.

Setting Up Instrument

1. Install the sensors and turn on the display by holding the instrument vertically.
    a. Ensure the display turns on and check the LCD to ensure the sensors are working.
2. The setup below is using the instrument's factory default settings. Use WinSitu or VuSitu to reset the instrument to
factory defaults if they have been changed.
    a. Take note of any changes in default units setup.

Wiring the Modbus Master

Connect the Twist-Lock termination to the instrument and wire the stripped-and-tinned connection as shown below:



Programming the PLC

1. Setup the serial communication the following values:

Mode	Start Bit	Baud Rate	Data Bits	Parity	Stop Bit
RTU	1	19200	8	Even	1

2. Set the device address to: 1
3. Set the PLC to wake-up the device by sending any Modbus command.
    a. This could be a carriage return, reading the slave id or reading any register.
4. Read the discovery register using Appendix A to trigger the instrument to scan the sensors.
    a. The return value can be discarded.
    b. Each register is a holding register. Some PLCs require you to add 40000 to the register number or address. For example: 9301 would be 49301.
    c. Alternatively, you can prompt the instrument to discover its sensor mapping by connecting it to the VuSitu mobile app or Win-Situ software.
5. Select the register to read on the PLC using Appendix B
    a. Some PLC devices use the register number directly in programming statements, others use register addresses, which are one less than the register number; the programmer must adhere to the PLC's programming style
    b. Each register is a holding register. Some PLCs require you to add 40000 to the register number or address. For example: 5451 would be 45451.
6. Set the type of register to: 32-bit float
    a. If asked by the PLC this is 2 registers
7. Set the byte order to: Big Endean (MSB)
    a. This should be the default and may not be configurable on all PLCs

Reading Parameters

To determine the starting register number for a given parameter register block, first determine its parameter id by looking in the sensor's parameter tables. Then calculate the starting register number of the parameter block using the following equation.

Starting Register = (Parameter Id – 1) x 7 + 5451

For example, for the Conductivity Sensor, the parameter id for specific conductivity is 10 (bit 9 will be set in register 6984 if it is available). The starting register number for the specific conductivity register block is thus (10 – 1) x 7 + 5451 = 5514.

The starting register for each parameter points to a block of 7 registers that contain the following information.

Register Offset	Size (Registers)	Mode & Access Level (R/W)	Data Type	Description
0	2	R	float	The measured value from sensor
2	1	R	ushort	Data Quality Id: If this is 0 then there are no errors or warnings. See: Full System Specification
3	1	R/W	float	Units Id for the measured value. The default values are listed in the table below.
4	1	R	ushort	Parameter Id: The ID of the parameter for this location. See: Full System Specification
5	2	R/W	float	Off line sentinel value: The value that's returned on error or if the parameter isn't available. The default sentinel is 0.0

Care and Maintenance

Maintenance Schedule

For best results, send the instrument to the manufacturer for factory calibration every 12 to 18 months.

User-Serviceable Parts

The user-serviceable parts on the instrument include the O-rings, removable sensors, RDO Sensor Cap and pH/ORP/ISE reference junction filling solution.

O-rings

The instrument has several O-rings that can be maintained by the user in order to keep moisture from entering the instrument and damaging the electronics. Apply a very thin layer of vacuum grease to new O-rings upon installation. Check O-rings for cracks, chips, or discoloration and change when any of these conditions appear.

pH/ORP & ISE Sensor Replacement

To replace the pH/ORP or ISE sensor or to refill the reference junction, follow the instructions in the Instruction Sheet that is included with the replacement sensor.

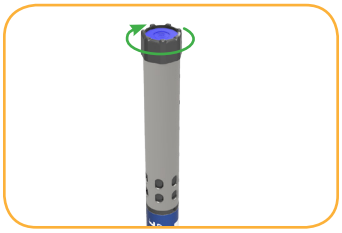
RDO Sensor Cap Replacement

The RDO-X Sensor Cap has a 2-year typical life. The RDO Fast Cap has a 1-year typical life. Follow the instructions included in the RDO Sensor Cap Replacement Kit. Replacement caps are available from In-Situ Inc. or your authorized In-Situ distributor.

Instrument Storage

Short-term Storage (less than one week)

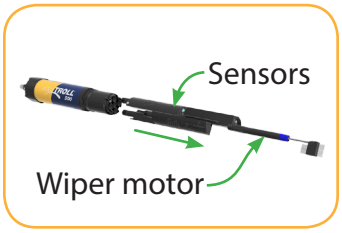
Place the restrictor in storage mode and pour ~15 mL of water, pH 4 buffer or pH/ISE storage solution over the sensors.



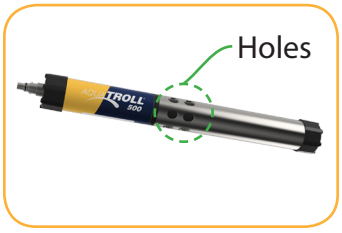
Screw the end cap onto the restrictor.

pH/ORP sensor must remain wet during storage. ISE sensors may be stored dry but must be reconditioned prior to calibration and deployment.

Long-term Storage (more than one week)



Remove the restrictor, sensors and wiper motor.



Thread the restrictor back onto the sonde with the holes at the center of the instrument.

Add a small amount of pH storage solution or pH 4 calibration standard to the sponge inside sensor cap.

Replace caps at both ends of sensor. Use electrical tape to seal the cap onto the sensor to prevent leaks or the sponge drying out.

Cleaning the Sonde

Rinse the sonde thoroughly, clean with warm water and mild soap, then rinse the sonde again. Allow to air dry. Be sure not to allow water to enter into the connector.

Cleaning and Storing the pH/ORP Sensor

If the ORP platinum electrode is dull or dirty, it can be cleaned with a swab and methanol or isopropyl alcohol. Rub the electrode gently until it is shiny.
The pH sensor must be kept moist for the life of the sensor. The sensor fill solution has a shelf life of 2 years. Replace the fill solution every 5 to 6 months or when:

- The sensor fails to calibrate within the acceptable slope and offset range.
- Sensor readings vary.
- Readings during calibration at pH 7 are greater than +30 mV or less than -30 mV.
- Sensor is slow to respond.

If the sensor fails to calibrate after you replace the fill solution, replace the reference junction.

Replacing the Filling Solution

Remove sensor from sonde and unscrew reference junction.

Discard old solution.

Insert tube from filling solution bottle into sensor.

Squeeze solution into reservoir until full. Slowly remove tube.

Reinstall reference juntion and wipe sensor body dry.

Soak sensor in tap water for at least 15 minutes.

If necessary, thoroughly clean the sensor connector to remove filling solution: Using a disposable pipette, fill the connector with isopropyl alcohol (70% to 100%), Shake to dry. Repeat 3 times. Dry overnight. When thoroughly dry, calibrate the sensor.

Replacing the Junction

Replace the junction when the sensor fails to calibrate with a reasonable slope and offset, even after you have replaced the filling solution.

- Unscrew the reference junction and discard.
- Replace the filling solution and screw in a new reference junction.
- Soak for 15 minutes, then calibrate the sensor.

Keep the junction damp at all times to avoid a lengthy rewetting process.

Cleaning

Begin with the most gentle cleaning method and continue to the other methods only if necessary. Do not directly wipe the glass bulb.
To clean the pH sensor, gently rinse with cold water. If further cleaning is required, consider the nature of the debris.
To remove crystalline deposits:

- Clean the sensor with warm water and mild soap.
- Soak the sensor in 5% HCl solution for 10 to 30 minutes.
- If deposits persist, alternate soaking in 5% HCl and 5% NaOH solutions.

To remove oily or greasy residue:

- Clean the sensor with warm water and mild soap.
- Methanol or isopropyl alcohol may be used for short soaking periods, up to 1 hour.
- Do not soak the sensor in strong solvents, such as chlorinated solvents, ethers, or ketones, such as acetone.

To remove protein-like material, or slimy film:

- Clean the sensor with warm water and mild soap.
- Soak the sensor in 0.1 M HCl solution for 10 minutes and then rinse with deionized water.

After performing any of these cleaning methods, rinse the sensor with water, then soak overnight in pH 4 buffer.

After performing any of these cleaning methods, rinse the sensor with water, then soak overnight in pH 4 buffer.

Storage Recommendations

Prior to using the pH sensor after long-term storage, rinse the sensor with DI water and then soak it in pH 4 buffer for 1 or 2 hours. This will saturate the glass bulb with hydrogen ions and prepare it for use.

Do not store the pH sensor in DI water because it will deplete the reference solution and drastically reduce the life of the sensor.

Cleaning and Storing the RDO Sensor

Routine Maintenance

1. Leave the sensor cap on.
2. Rinse the sensor with clean water.
3. Gently wipe with a soft cloth or brush if biofouling is present.
4. If extensive fouling or mineral buildup is present, soak the sensor in vinegar for 15 minutes, then soak in deionizedwater for 15 minutes.

Do not use organic solvents—they will damage the sensor cap. Do not remove the sensor cap when rinsing or brushing.

6. After cleaning the sensor, perform a 2-point calibration.

Cleaning the optical window

1. Remove the cap.
2. Gently wipe the sensing window with the supplied lens cloth.

Do not wet the lens with any liquid.

Storage

Prior to installation, store the sensor body and cap in the factory supplied containers.
Once installed on the sonde, the RDO sensor can be stored wet or dry depending on the sensor configuration of the sonde.

Never store the RDO sensor without the sensor cap once it has been installed on the sonde.

Cleaning and Storing the Conductivity Sensor

Cleaning

Begin with the most gentle cleaning method and continue to the other methods only if necessary.
To clean the conductivity sensor face, gently rinse with clean, cold water. If further cleaning is required, consider the nature of the debris.
To remove crystalline deposits:

- Clean the sensor face with warm water and mild soap.
- Use a soft brush to gently clean the sensor pins and temperature button. Ensure removal of all debris around the base of the pins and button.
- If crystalline deposits persist, soak in 5% HCl for 10 to 30 minutes followed by warm soapy water and soft brushing.
- If deposits persist, alternate soaking in 5% HCl and 5% NaOH solutions followed by warm soapy water and soft brushing.

To remove oily or greasy residue:

- Clean the sensor face with warm water and mild soap.
- Using a soft brush, gently clean the sensor pins and temperature button. Ensure removal of all residue around the base of the pins and temperature button.
- Isopropyl alcohol may be used for short soaking periods, up to one hour.
- Do not soak in strong solvents such as chlorinated solvents, ethers or ketones (such as acetone).

To remove protein-like material, or slimy film:

- Clean the sensor face with warm water and mild soap.
- Using a soft brush, gently clean the sensor pins and temperature button. Ensure removal of all material/film around the base of the pins and temperature button.
- Soak the sensor in 0.10% HCl for 10 minutes and then rinse thoroughly with distilled water.

Storage

Prior to installation, store the sensor in the factory supplied container.
Once installed on the sonde, the Temperature Sensor and Conductivity Sensor can be stored wet or dry depending on the sensor configuration of the sonde. For the best accuracy over instrument life, keep the conductivity cell submersed in water for 24-48 hours prior to calibration and deployment.

Cleaning and Storing the Turbidity Sensor

Routine Maintenance

The optical windows should be clear of foreign material. To clear material gently rub the sensing windows using clean water and a soft cloth or swab. Do not use solvents on the sensor.

Storage

Prior to installation, store the sensor in the factory supplied container. Once installed on the sonde, the turbidity sensor can be stored wet or dry depending on the sensor configuration of the sonde.

Instrument Specifications

Operating temperature	-5° to 50° C (23° to 122° F)
Storage temperature	Components without fluid: -40° to 65° C (-40° to149°F) pH/ORP probes: -5° to 65°C
Dimensions	Length: 46 cm (18.145") (includes connector) Diameter: 4.7 cm (1.860") With bail: 59cm (23.25")
Weight	0.978kg / 2.15 lbs. (includes instrument, sensors, restrictor and bumpers)
Wetted materials (sonde and sensors)	PC, PC alloy, Delrin, Santoprene, Inconel, Viton, Titanium, Platinum, Ceramic, Nylon, PVC, Graphite
Environmental rating	IP68 with all sensors and cable attached. IP67 with sensors removed, battery cover removed, or cable detached
Max pressure rating	Up to 150 PSI Ammonium/Nitrate up to 30PSI
Communication	RS485/MODBUS, Wireless TROLL Com, Bluetooth®
Reading rate	1 reading every 2 seconds
LCD screen	Integrated display shows status of sonde, sensor ports, power voltage and connectivity. BlueTooth may be disabled through the hidden menu
External power voltage External power current[1]	8-36 VDC (required for normal operation) Sleep: < 0.2 mA typical Measurement: 40 mA typical, 75 mA Max
Interface	Win-Situ 5 Software, VuSitu Mobile App on select mobile devices using Android 4.4 with Bluetooth 2.0
Cable	Vented or non-vented polyurethane or vented Tefzel®
Hex screw driver	0.050 in. (1.3 mm)
Software	Android: VuSitu through Google Play Windows: Win-Situ 5 Data Services: HydroVu
Interface	Android 4.4, requires BlueTooth 2.0
Certifications	CE, FCC, WEEE, RoHS Compliant

Sensor Specifications

Sensor	Shelf Life	Field Life	Recommended Calibration Frequency	Pressure Rating - PSI	Usable Depth Meters Feet		Operational Temperature Range
pH/ORP	15 months	1 year or greater	10 to 12 weeks	350	200	650	-5° to 50° C
RDO	NA	2 years or greater	12 months	350	200	650	-5° to 50° C
Conductivity	NA	2 years or greater	User calibration only if needed	350	200	650	-5° to 50° C
Temperature	NA	2 years or greater	NA	350	200	650	-5° to 50° C
Turbidity	NA	2 years or greater	User calibration only if needed	350	200	650	-5° to 50° C
Pressure	NA	2 years or greater		12.8 42.7 108 285	9 30 76 200	30 100 250 650	-5° to 50° C
Barometric Pressure	NA	2 years or greater		NA	NA	NA	-5° to 50° C
Ammonium	6 months	6 to 12 months	Monthly	30	25	70	0° to 40° C
Chloride	6 months	1 year or greater	Monthly	350	200	650	0° to 40° C
Nitrate	6 months	6 to 12 months	Monthly	30	25	70	0° to 40° C
Chlorophyll a	NA	2 years or greater	User calibration only if needed	350	200	650	-5° to 50° C
BGA-PC	NA	2 years or greater		350	200	650	-5° to 50° C
BGA-PE	NA	2 years or greater		350	200	650	-5° to 50° C
Rhodamine WT	NA	2 years or greater		350	200	650	-5° to 50° C

Accuracy, Range & Resolution

Temperature[2]	**Accuracy**	+/- 0.1° C
	Range	-5 to 50° C (23 to 122° F)
	Resolution/Precision	0.01° C
	Response Time	T63<2s, T90<15s, T95<30s
	Units of Measure	Celsius or Fahrenheit
	Method	EPA 170.1
Barometric Pressure (vented models only)	**Accuracy**	+/- 1.0 mBars
	Range	300 - 1100 mBars
	Resolution/Precision	0.1 mBar
	Response Time	T63<1s, T90<1s, T95<1s
	Units of Measure	Pressure: psi, kPa, bar, mbar, inHg, mmHg;
	Method	Silicon strain gauge
pH[3]	**Accuracy**	±0.1 pH unit or better
	Range	0-14 pH
	Resolution/Precision	0.01 pH
	Response Time	T63<3s, T90<15s, T95<30s
	Units of Measure	pH, mV
	Method	Std. Methods 4500-H+, EPA 150.2
ORP[4]	**Accuracy**	+/- 5 mV
	Range	±1400 mV
	Resolution/Precision	0.1 mV
	Response Time	T63<3s, T90<15s, T95<30s
	Units of Measure	mV
	Method	Std. Methods 2580

Conductivity[5]	**Accuracy**	±0.5% of reading plus 1 µS/cm from 0 to 100,000 µS/cm; ±1.0% of reading from 100,000 to 200,000 µS; ±2.0% of reading from 200,000 to 350,000 µS/cm
	Range	0 to 350,000µS/cm 0-350 ppt 0-350 PSU
	Resolution/Precision	0.1 µS/cm 0.1 ppt 0.1 PSU
	Response Time	T63<1s, T90<3s, T95<5s
	Units of Measure	Actual conductivity (µS/cm, mS/cm); Specific conductivity (µS/cm, mS/cm); Salinity (PSU, ppt); Total dissolved solids (ppt, ppm); Resistivity (Ohms-cm); Density (g/cm3)
	Method	Std. Methods 2510, EPA 120.1 Std. Methods 2520A
Rugged Dissolved Oxygen[6]	**Accuracy**	±0.1mg/L +/-2% of reading
	Range	0 to 20 mg/L 20 to 60 mg/L
	Resolution/Precision	0.01 mg/L
	Response Time	RDO-X: T63<15s, T90<45s, T95<60s Fast Cap: T63<15s, T90<45s, T95<60s
	Units of Measure	mg/L, %saturation, ppm
	Method	EPA-approved In-Situ Methods: 1002-8-2009, 1003-8-2009, 1004-8-2009
Turbidity[7]	**Accuracy**	+/-2% of reading or +/-2 NTU, FNU, w.i.g.
	Range	0 – 4,000 NTU 0-1500 mg/L
	Resolution/Precision	0.01 NTU (0-1000); 0.1 NTU (1000-4000) 0.1 mg/L
	Response Time	T63<1s, T90<1s, T95<1s
	Units of Measure	NTU, FNU ppt, mg/L
	Method	ISO 7027
Ammonium[8,9]	**Accuracy**	±10% or ± 2mg/L, w.i.g.*
	Range	0-10,000 mg/L as N
	Resolution/Precision	0.01mg/L
	Response Time	T63<1s, T90<10s, T95<30s
	Units of Measure	mg/L, ppm, mV
	Method	

Unionized Ammonia, Total Ammonia	**Accuracy**	
	Range	0-10,000 mg/L as N
	Resolution/Precision	0.01mg/L
	Response Time	-
	Units of Measure	mg/L, ppm
	Method	-
Nitrate[8]	**Accuracy**	±10% or ± 2mg/L, w.i.g.*
	Range	0-40,000 mg/L as N
	Resolution/Precision	0.01mg/L
	Response Time	T63<1s, T90<1s, T95<1s
	Units of Measure	mg/L, ppm, mV
	Method	Std. Methods 4500-NO3 D
Chloride[8]	**Accuracy**	±10% or ± 2mg/L, w.i.g.*
	Range	0-150,000 mg/L - Cl-
	Resolution/Precision	0.01mg/L
	Resposne Time	T63<1s, T90<10s, T95<30s
	Units of Measure	mg/L, ppm, mV
	Method	Std. Methods 4500-Cl- D
Pressure[10]	**Accuracy**	±0.1% full scale (FS)
	Range	Non-Vented or Vented 9.0 m (30 ft.) - Burst: 27 m (90 ft.) 30 m (100 ft.) - Burst: 40 m (130 ft.) 76 m (250 ft.) - Burst: 107 m (350 ft.) 100 m (325 ft.) - Burst: 200 m (650 ft.)
	Resolution/Precision	0.01% full scale
	Response Time	T63<1s, T90<1s, T95<1s
	Units of Measure	Pressure: psi, kPa, bar, mbar, inHg, mmHg; Level: in, ft., mm, cm, m; Level: in, ft., mm, cm, m
	Method	Piezoresistive; Ceramic

Chlorophyll a	**Linearity**	$R^2 > 0.999$ for serial dilutions of 0-1000 µg/L Chl a in MeoH
	Range	0-100 RFU 0-1,000 µg/L Chl. A in MeOH
	Resolution/Precision	.001 RFU .01 µg/L Chl. a
	Response Time	T63 < 1s, T90 < 1s, T95 < 1s
	Units of Measure	Concentration: µg/L Fluorescence: RFU
	Excitation Wavelength (nominal)	430 nm
	Detection Wavelength	675 nm to 750nm
BGA-PC	**Linearity**	$R^2 > 0.999$ for serial dilution of PC standards from 0-1000 µg/L PC
	Range	0-100 RFU 0-1000 µg/L PC
	Resolution/Precision	.001 RFU .01 µg/L PC
	Response Time	T63 < 1s, T90 < 1s, T95 < 1s
	Units of Measure	Concentration: µg/L Fluorescence: RFU
	Excitation Wavelength (nominal)	590 nm
	Detection Wavelength	640 nm to 690 nm
BGA-PE	**Linearity**	$R^2 > 0.999$ for serial dilution of PE standards 0-1000 µg/L PE
	Range	0-100 RFU 0-1000 µg/L PE
	Resolution/Precision	.001 RFU .01 µg/L PE
	Response Tme	T63 < 1s, T90 < 1s, T95 < 1s
	Units of Measure	Concentration: µg/L Fluorescence: RFU
	Excitation Wavelength (nominal)	498 nm
	Detection Wavelength	575 nm to 625 nm
Rhodamine WT	**Linearity**	$R^2 > 0.999$ for serial dilution of RWT (Rhodamine Water Tracer) standards from 0-1000 µg/L
	Range	0-100 RFU 0-1000 µg/L
	Resolution/Precision	.001 RFU .01 µg/L
	Response Time	T63 < 1s, T90 < 1s, T95 < 1s
	Units of Measure	Concentration: µg/L Fluorescence: RFU

	Excitation Wavelength (nominal)	530 nm
	Detection Wavelength	580 nm to 660 nm

Warranty[11]	2 year - Sonde, RDO and sensor cap, temperature/conductivity, temperature only, turbidity (excluding pH/ORP) 1 year - pH/ORP, chloride ISE, accessories 90 Days - Nitrate and Ammonium ISE sensors Other: see warranty policy (www.in-situ.com/warranty)
Notes	Specifications are subject to change without notice. Android is a trademark of Google, Inc. Bluetooth is a trademark of Bluetooth SIG, Inc. Delrin and Tefzel are trademarks of E.I. du Pont de Nemours & Co. Santoprene is a trademark of ExxonMobile. Inconel is a trademark of Special Metals Corporation. Viton is a registered trademark of DuPont Performance Elastomers L.L.C.

[1] Dependent on display and wiping
[2] Typical system response with instrument, sensors and restrictor when changing approximately 15° C in moderate flow
[3] Response time at thermal equilibrium
[4] Accuracy from calibration standard @ 25C, response-at thermal equilibrium immediately following calibration in ZoBell's measuring from air to +400 mV
[5] Accuracy at calibration points
[6] RDO sensor full range 0-50mg/L, 0-500% sat. EPA-approved under the Alternate Test Procedure process
[7] User defined reference
[8] Between 2 calibration points immediately following proper conditioning and calibration. Varies on site conditions and environmental interferents. See sensor summary sheet for potential interferences
[9] Average response, can be longer with increasing concentrations of ammonium
[10] Typical performance across full temperature and pressure calibrated range
[11] Extended warranty option for sonde only (1-3 year extension for up to 5 years total)

Potential Interferents

pH

Sodium salts

Dissolved Oxygen

Temperature, atmospheric pressure, salinity, chlorinity

Ammonium

Celsium, Potassium, Thalium, pH, Silver, Lithium, Sodium

Nitrate

Perchlorate, Iodide, Chlorate, Cyanide, Bromide, Nitrite, Hydrogen Sulfide (bisulfite), Hydrogen Carbonate (bicarbonate), Carbonate, Chloride, Dihydrogen Phosphate, Hydrogen Phosphate, Phosphate, Acetate, Fluoride, Sulfate

Conductivity

Temperature

ORP

Ions that are stronger reducing agents than hydrogen or platinum, e.g., chromium, vanadium, titanium

Chloride

Hydroxide, Ammonia, Thiosulfate, Bromide, Sulfide, Iodide, Cyanide

BGA-PC, BGA-PE, Chlorophyll a, Rhodamine WT

Turbidity

Ammonium, Chloride and Nitrate Interferent Concentrations

Ammonium

The table below lists concentrations of possible interfering ions that cause 10% error at various levels (in ppm) of NH_4^+.

Ion	100 ppm NH_4^+	10 ppm NH_4^+	1 ppm NH_4^+
Celsium (Cs^+)	100	10	1
Potassium (K^+)	270	27	2.7
Thalium (Tl^+)	3100	310	31
pH (H^+)	pH 1.6	pH 2.6	pH 3.6
Silver (Ag^+)	270,000	27,000	2,700
Lithium (Li^+)	35,000	3,500	350
Sodium (Na^+)	11,100	1,100	110

Chloride

The table below lists concentrations of possible interfering ions that cause 10% error at various levels (in ppm) of Cl^-.

Ion	100 ppm Cl^-	10 ppm Cl^-	1 ppm Cl^-
Hydroxide (OH^-)	3,840	384	38.4
Ammonia (NH_3)	6	0.6	0.06
Thiosulfate ($S_20_3^{2-}$)	3	0.3	0.03
Bromide (Br^-)	0.68	0.068	6.8×10^{-3}
Sulfide ($S2^-$)	9×10^{-4}	9×10^{-6}	9×10^{-7}
Iodide (I^-)	1.8×10^{-4}	1.8×10^{-5}	1.8×10^{-6}
Cyanide (CN^-)	1.5×10^{-5}	1.5×10^{-6}	1.5×10^{-7}

Nitrate

The table below lists concentrations of possible interfering ions that cause 10% error at various levels (in ppm) of $N0_3^-$.

Ion	100 ppm NO_3^- as N	10 ppm NO_3^- as N	1 ppm NO_3^- as N
Perchlorate (ClO_4^-)	7×10^{-2}	7×10^{-3}	7×10^{-4}
Iodide (I^-)	4	0.4	0.04
Chlorate ($ClO3^-$)	30	3	0.3
Cyanide (CN^-)	20	2	0.2
Bromide (Br^-)	400	40	4
Nitrite (NO_2^-)	230	23	2
Hydrogen Sulfide (HS^-)	230	23	2
Bicarbonate (HCO_3^-)	440	440	44
Carbonate (CO_3^{2-})	8,600	860	86
Chloride (Cl^-)	7,600	760	76
Dihydrogen Phosphate ($H_2PO_4^-$)	34,640	3,464	346
Hydrogen Phosphate (HPO_4^{2-})	34,300	3,430	343

Phosphate (PO_4^{3-})	33,900	3,390	339
Acetate (OAc^-)	104,200	10,420	1,042
Fluoride (F^-)	81,400	8,140	814
Sulfate (SO_4^{2-})	685,600	68,570	6,857

RDO Cap—Chemical Incompatability

The following chemicals will damage the RDO sensing element:

- Alcohols > 5%
- Hydrogen peroxide > 3%
- Sodium hypochlorite (commercial bleach) > 3%
- Gaseous sulfur dioxide
- Gaseous chlorine
- Do not use in organic solvents (e.g., acetone, chloroform, methylene chloride, etc.), which may destroy the sensing element

More Information

To learn more about the Aqua TROLL 500, telemetry, software and other In-Situ products, see the resources listed below.

1 Visit www.in-situ.com

Find information about In-Situ water quality, water level, telemetry and other products. Download software, manuals and product instructions.

2 View the In-Situ YouTube channel.

Get video instructions for the Aqua TROLL 500 and other instruments. Watch quickstart videos and other tutorials.

3 Call In-Situ's technical support team.

For further instructions and help with technical questions, call the In-Situ support line.

Declaration of Similarity

Manufacturer: In-Situ, Inc.
221 East Lincoln Avenue
Fort Collins, CO 80524
USA

Declares that the following product:

Product name: Aqua TROLL® 600 Multiparameter Sonde
Model: Aqua TROLL® 500
Product Description: Multiparameter water quality data logger

is in compliance with the following Directive

2004/108/EC for Electromagnetic Compatibility (EMC) Directive

and meets or exceeds the following international requirements and compliance standards:

- **Immunity**
  EN 61326, Electrical Equipment for Measurement, Control and Laboratory Use, Industrial Location

- **Emissions**
  Class A requirements of EN 61326, Electrical Equipment for Measurement, Control and Laboratory Use

Supplementary Information:
The device complies with the requirements of the EU Directives 2014/30/EU and 2014/35/EU, and the CE mark is affixed accordingly.

Ben Kimbell
VP of R&D
In-Situ, Inc.
April 23, 2018

CE FC

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Appendix A: Sensor Discovery

The first register read in a PLC measurement sequence should be a 14-register block beginning with register number 6984. Reading these registers triggers the sonde to scan its sensor ports and update its sensor map. This guarantees the sonde has properly registered any changes to the sensor configuration a user may have made since the last measurement sequence. The bitwise contents of these registers indicate which parameter IDs (1 to 219) are currently available from the sonde according to the table below. Refer to Appendix B for a description of the parameter ids.

Parameter ID Map

Register	Bit				
	15	**14**	**13...2**	**1**	**0**
6984	16	15	14...3	2	1
6985	32	31	30...19	18	17
6986	48	47	46...35	34	33
6987	64	63	65...51	50	49
6988	80	79	78...67	66	65
6989	96	95	94...83	82	81
6990	112	111	110...99	98	97
6991	128	127	126...115	114	113
6992	144	143	142...131	130	129
6993	160	159	158...147	146	145
6994	176	175	174...163	162	161
6995	192	191	190...179	178	177
6996	208	207	206...195	194	193
6997	0	0	219...211	210	209

Appendix B: Parameter Numbers and Locations

ID	Parameter Name	Holding Register Number	Holding Register Address	Default Units
1	Temperature	5451	5450	1 = °C
2	Pressure	5458	5457	17 = PSI
3	Depth	5465	5464	38 = feet
4	Level, Depth to Water	5472	5471	38 = feet
5	Level, Surface Elevation	5479	5478	38 = feet
9	Actual Conductivity	5507	5506	65 = µS/cm
10	Specific Conductivity	5514	5513	65 = µS/cm
11	Resistivity	5521	5520	81 = ohm-cm
12	Salinity	5528	5527	97 = PSU
13	Total Dissolved Solids	5535	5534	114 = ppt
14	Density of Water	5542	5541	129 = g/cm^3
16	Barometric Pressure	5556	5555	22 = mmHg
17	pH	5563	5562	145 = pH
18	pH mV	5570	5569	162 = mV
19	ORP	5577	5576	162 = mV
20	Dissolved Oxygen Concentration	5584	5583	117 = mg/L
21	Dissolved Oxygen % Saturation	5591	5590	177 = % saturation
24	Chloride (Cl^-)	5612	5611	117 = mg/L
25	Turbidity	5619	5618	194 = NTU
30	Oxygen Partial Pressure	5654	5653	26 = torr
31	Total Suspended Solids	5661	5660	117 = mg/L
32	External Voltage	5668	5667	163 = Volts
33	Battery Capacity (remaining)	5675	5674	241 = %
34	Rhodamine WT Concentration	5682	5681	118 = µg/L
35	Rhodamine WT Fluorescence Intesity	5689	5688	257 = RFU
36	Chloride (Cl^-) mV	5696	5695	162 = mV
37	Nitrate as Nitrogen (NO_3 as N) Concentration	5703	5702	117 = mg/L
39	Ammonium as Nitrogen (NH_4 as N) Concentration	5717	5716	117 = mg/L
40	Ammonium (NH_4) mV	5724	5723	162 = mg/L
41	Ammonia as Nitrogen (NH_3 as N) Concentration	5731	5730	117 = mg/L
42	Total Ammonia as Nitrogen (NH_3 as N) Concentration	5738	5737	117 = mg/L
48	Eh	5780	5779	162 = mg/L

49	Velocity	5787	5786	118 = µg/L
50	Chlorophyll-a Concentration	5894	5793	118 = µg/L
51	Chlorophyll-a Fluorescence Intensity	5801	5800	257 = RFU
54	Blue Green Algae-Phycocyanin Concentration	5822	5821	118 = µg/L
55	Blue Green Algae-Phycocyanin Fluorescence Intensity	5829	5828	257 = RFU
58	Blue Green Algae-Phycocerythrin Concentration	5850	5849	118 = µg/L
59	Blue Green Algae-Phycocerythrin Fluorescence Intensity	5857	5856	257 = RFU

Appendix C: Unit IDs

ID	Abbreviation	Units
Temperature		
1	C	Celsius
2	F	Fahrenheit
3	K	Kelvin
Pressure, Barometric Pressure (17-32)		
17	PSI	Pounds per square inch
18	Pa	Pascals
19	kPa	Kilopascals
20	Bar	Bars
21	mBar	Millibars
22	mmHg	Millimeters of Mercury (0° C)
23	inHg	Inches of Mercury (0° C)
24	cmH_20	Centimeters of water (4° C)
25	inH_20	Inches of water (4° C)
26	Torr	Torr
27	atm	Standard atmosphere
Distance/Length (33-48)		
33	mm	Millimeters
34	cm	Centimeters
35	m	Meters
36	km	Kilometers
37	in	Inches
38	ft	Feet
Coordinates (49-64)		
49	deg	Degrees
50	min	Minutes
51	sec	Seconds
Conductivity (65-80)		
65	µS/cm	Microsiemens per centimeter
66	mS/cm	Millisiemens per centimeter
Resistivity (81-96)		
81	ohm-cm	Ohm-centimeters
Salinity (97-112)		
97	PSU	Practical salinty units
98	ppt	Parts per thousand salinity
Concentration (113-128)		
113	ppm	Parts per million
114	ppt	Parts per thousand
115		(available)
116		(available)
117	mg/L	Milligrams per liter
118	µg/L	Micrograms per liter
119	---	(deprecated, no longer available)

120	g/L	Grams per liter
121	ppb	Parts per billion
Density		
129	g/cm^3	Grams per cubic centimeter
pH		
145	pH	pH
Voltage (161-176)		
161	µV	Microvolts
162	mV	Millivolts
163	V	Volts
Dissolved Oxygen (DO) % Saturation (177-192)		
177	% sat	Percent saturation
Turbidity (193-208)		
193	FNU	Formazin nephelometric units
194	NTU	Nephelometric turbidity units
195	FTU	Formazin turbidity units
Flow (209-224)		
209	ft^3/s	Cubic feet per second
210		(available)
211		(available)
212	ft^3/day	Cubic feet per day
213	gal/s	Gallons per second
214	gal/m	Gallons per minute
215	gal/hr	Gallons per hour
216	MGD	Millions of gallons per day
217	m^3/sec	Cubic meters per second
218		(available)
219	m^3/hr	Cubic meters per hour
220		(available)
221	L/s	Liters per second
222	ML/day	Millions of liters per day
223	mL/min	Milliliters per minute
224	kL/day	Thousands of liters per day
Volume (225-240)		
225	ft^3	Cubic feet
226	gal	Gallons
227	Mgal	Millions of gallons
228	m^3	Cubic meters
229	L	Liters
230	acre-ft	Acre feet
231	mL	Milliliters
232	ML	Millions of liters
233	kL	Thousands of liters
234	acre-in	Acre inches
% (241-256)		
241	%	Percent

Fluorescence		
257	RFU	Relative fluorescence units
Low-Flow (273-288)		
273	ml/sec	Milliliters per second
274	ml/hr	Milliliters per hour
275	l/min	Liters per minute
276	l/hr	Liters per hour
Current (289-304)		
289	µA	Microamps
290	mA	Milliamps
291	A	Amps
Velocity		
305	ft/s	Feet per second
306	m/s	Meters per second

Appendix D: Register Data Formats

The Modbus protocol specification requires any multiple-byte data type to be transmitted in Big Endean order, or most significant byte (MSB) first. In-Situ devices shall use the following register data formats.

ID	Type	Size (Registers)	Description
2	Unsigned Short	1	2 bytes, 1 register, MSB first
5	Float	2	4 bytes, 2 registers. IEEE floating point format

Ammonia CHEMets® Kit

K-1510/R-1501: 0 - 1 & 1 - 10 ppm N

Sample Temperature

Sample temperatures that deviate significantly from 20°C (68°F) may introduce test result bias.

Non-Seawater Test Procedure

1. Fill the sample cup to the 25 mL mark with the sample to be tested (fig. 1).
2. Add 2 drops of S-1500 Stabilizer Solution (fig. 2). Stir to mix the contents of the cup.
3. Place the CHEMet ampoule, tip first, into the sample cup. Snap the tip. The ampoule will fill leaving a bubble for mixing (fig. 3).
4. To mix the ampoule, invert it several times, allowing the bubble to travel from end to end.
5. Dry the ampoule. Obtain a test result **1 minute** after snapping the tip.
6. Obtain a test result using the appropriate comparator.
   a. **Low Range Comparator (fig. 4):** Place the ampoule, flat end first, into the comparator. Hold the comparator up toward a source of light and view from the bottom. Rotate the comparator until the best color match is found.
   b. **High Range Comparator (fig. 5):** Place the ampoule between the color standards until the best color match is found.

NOTE: Use the 1 - 10 ppm concentration scale on the comparator label.

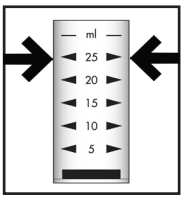


Figure 1

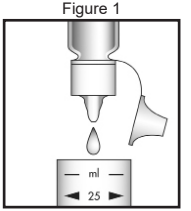


Figure 2

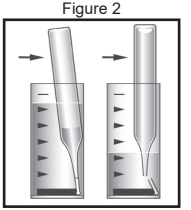


Figure 3

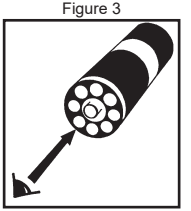


Figure 4

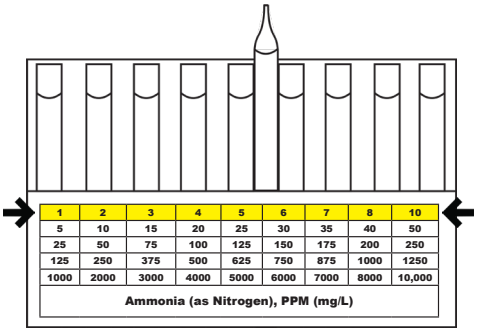


Figure 5

Seawater Test Procedure

Product Change Notice: S-1501 Stabilizer Solution and 1 mL syringe, Catalog No. A-0027 are sold separately for use in seawater testing.

1. Add 1.0 mL of S-1501 Stabilizer Solution to the empty sample cup.
2. Fill the sample cup to the 25 mL mark with the seawater sample to be tested (fig. 1).
3. Perform the Test Procedure above, beginning with Step # 3.

Test Method

The Ammonia CHEMets®[1] test kit employs direct nesslerization.[2,3] In a strongly alkaline solution, ammonia reacts with Nessler Reagent (K_2HgI_4) to produce a yellow-colored complex in direct proportion to the ammonia concentration.

This method is applicable to drinking water, clean surface water, good quality nitrified wastewater effluent and seawater. Other types of samples may require a preliminary distillation step.

1. CHEMets is a registered trademark of AquaPhoenix Scientific, LLC U.S. Patent No. 3,634,038
2. APHA Standard Methods, 18th ed., Method 4500-NH_3 C - 1988
3. ASTM D 1426 - 08, Ammonia Nitrogen in Water, Test Method A

Safety Information

Read SDS before performing this test procedure. Wear safety glasses and protective gloves.

Aug. 25, Rev. 19

Operating Instructions

OAKTON®

PCTSTestr™ 50 Pocket Tester

CE

Applications

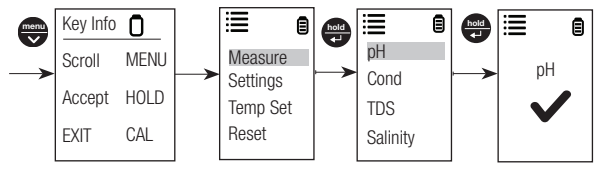
- Agriculture
- Aquaculture
- Aquariums and fish farms
- Boiler blow-down
- Car washes
- Drinking water
- Ecology
- Electroplating rinse tanks
- Food sectors
- Hydroponics
- Labs
- Printing industry
- Swimming pools
- Verification of reverse osmosis system operation
- Water and waste-water treatment

Getting Started

The PCTSTestr 50 Pocket Tester has been factory calibrated and usually works well out of the box. However, after extended periods of non-use, it is best to remove the sensor cap and soak the sensor in warm tap water for 10 minutes or so. Prior to taking the measurements, periodic calibration with certified standards is recommended for best accuracy.

Measurement Parameter Setting

1. Press ON/OFF (⏻) to power on the tester.
2. Press MENU/∨ to enter setup window. Press HOLD/↵ to select Measure. The display shows pH, Cond, TDS and Salinity.
3. Scroll down by pressing MENU/∨ to toggle between pH, Cond, TDS and Salinity. Press HOLD/↵ to select pH.
4. The display shows the selected parameter with a ✔.

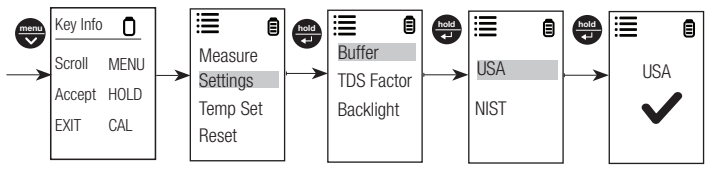


pH Buffer Set Selection

PCTSTestr 50 Pocket Tester features USA (pH 4.01, pH 7.00 and pH 10.01) or NIST (pH 4.01, pH 6.86, and pH 9.18) standards. Select either one to suit your requirements.

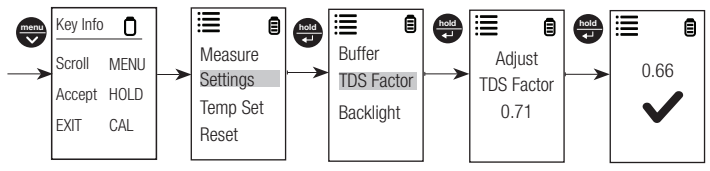
1. Press MENU/∨ to enter setup window. Press HOLD/↵ to select Settings. The display shows Buffer, TDS Factor and Backlight.

2. Press HOLD/↵ to select Buffer. Display shows USA and NIST.
3. Press HOLD/↵ to select USA or scroll down by pressing MENU/∨ to toggle between the two buffer standards.
4. The display shows the selected buffer standard with a ✔.



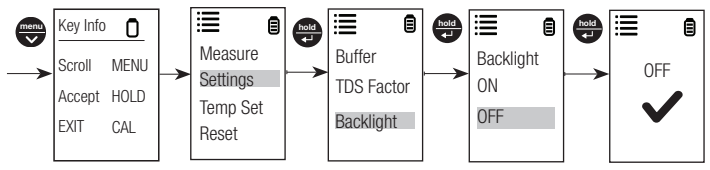
TDS Factor Setting

1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Settings.
2. Press HOLD/↵ to select Settings. The display shows Buffer, TDS Factor and Backlight.
3. Scroll down by pressing MENU/∨ to toggle between the Buffer, TDS Factor and Backlight. Press HOLD/↵ to select the TDS Factor.
4. Press HOLD/↵ to select the default TDS factory setting or MENU/∨ to adjust the setting.
5. Press HOLD/↵ to confirm the selection of the setting. The display shows the selected value (TDS factor) with a ✔.



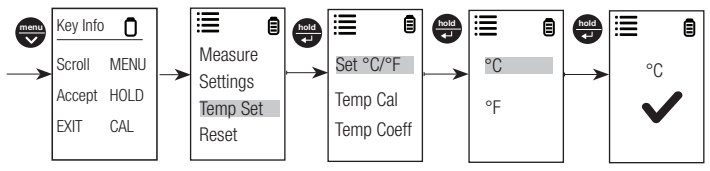
Backlight Settings

1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Settings.
2. Press HOLD/↵ to select Settings. The display shows Buffer, TDS Factor and Backlight.
3. Scroll down by pressing MENU/∨ to toggle between Buffer, TDS Factor and Backlight. Press HOLD/↵ to select Backlight.
4. The display shows ON and OFF. Scroll down by pressing MENU/∨ to toggle between ON and OFF. Backlight ON increases readability in low-light conditions.
5. Press HOLD/↵ to select the desired backlight option. The display shows the selected backlight option with a ✔.



Temperature Settings

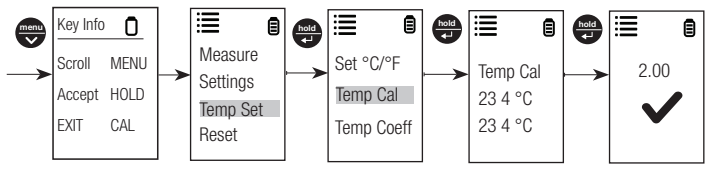
1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Temp Set. Press HOLD/↵ to select Temp Set. The display shows Set °C/°F, Temp Cal and Temp Coeff.
2. Press HOLD/↵ to select Set °C/°F. Scroll down by pressing MENU/∨ to toggle between °C and °F.
3. Press HOLD/↵ to select temperature unit. The display shows the selected temperature setting with a ✔.



Temperature Calibration

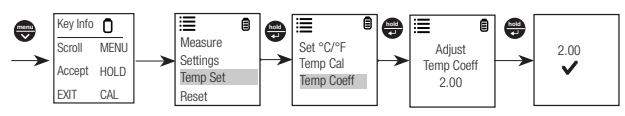
1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Temp Set.
2. Press HOLD/↵ to select Temp Set. The display shows Set °C/°F, Temp Cal and Temp Coeff.
3. Scroll down by pressing MENU/∨ to toggle between Set °C/°F, Temp Cal and Temp Coeff. Press HOLD/↵ to select Temp Cal.
4. The lower display shows the current measured temperature reading based on the last set offset and the upper display shows the current measured temperature reading based on factory default calibration.
5. Dip the tester into a solution of known temperature and allow time for the built-in temperature sensor to stabilize.
6. Press MENU/∨ to adjust the temperature value or press the HOLD/↵ to confirm the calibrated value as the new temperature value of the solution.

Note: To exit this program without confirming the calibration, press CAL/ESC.



Temperature Coefficient

1. Pres MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Temp Set.
2. Press HOLD/↵ to select Temp Set. The display shows Set °C/°F, Temp Cal and Temp Coeff.
3. Scroll down by pressing MENU/∨ to toggle between Set °C/°F, Temp Cal and Temp Coeff.
4. Press HOLD/↵ to select Temp Coeff or MENU/∨ to adjust the Temp Coeff.
5. Press HOLD/↵ to confirm the Temp Coeff value. The new value is automatically confirmed with a ✔.



pH Calibration

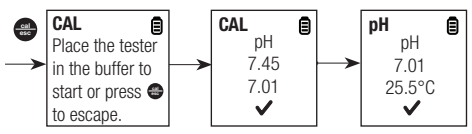
Calibration should be done regularly, recommended once a week. Calibrate up to three points using either the USA or the NIST buffer set standards.

1. Press ON/OFF (⏻) to power on the tester if needed.
2. Dip electrode about 2 cm to 3 cm into the pH standard buffer solution.
3. Stir gently and press CAL/ESC to enter calibration mode. The CAL indicator will be displayed. The upper display will show the measured reading based on the last calibration while the lower display will indicate the pH standard buffer solution.

Note: To abort calibration, press CAL/ESC to escape.

4. Allow about 2 minutes for the tester reading to stabilize. The timer icon blinks during this time. Once the reading is stabilized, the timer stops blinking. Automatic confirmation happens when the buffer is found and the display returned to measurement window with reading calibrated to pH standard buffer solution.
5. Repeat with other buffers if necessary. Rinse electrode before dipping into next buffer.

Note: The calibration mode allows you to perform up to three calibration points. Calibration is automatically confirmed with the buffer identification. No user interaction is required after starting the calibration by pressing CAL/ESC.

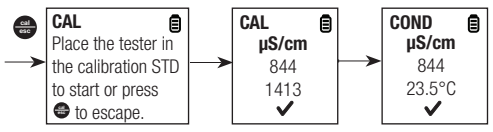


Calibration for Conductivity, TDS, or Salinity

For best results, periodic calibration with an accurate standard is recommended prior to measurement. Use the calibration standard value that is close to your intended sample value. The tester will retain one calibration value in each mode (conductivity, TDS, salinity) when the instrument is powered off. The conductivity value can be calibrated automatically or manually, while the TDS & salinity values require manual calibration. The tester will begin in the measurement mode that was used when it was powered off. See "Measurement Parameter Setting" to change the desired parameter.

Automatic Calibration for Conductivity

1. Remove the cap and press ON/OFF (⏻) to power on.
2. Dip the sensor in at least 30 mm of calibration standard.
3. Stir gently and press CAL/ESC to begin the calibration.
4. The display will show CAL followed by the default value. CAL is indicated on the display during calibration mode.
5. If the reading is within the calibration range of the automatically recognized standards; 80 (84 µS/cm), 1410 (1413 µS/cm), or 12.90 (12.88 mS/cm), the ✔ icon is displayed when the automatic calibration standard value has been detected.
6. Press HOLD/↵ to accept the auto conductivity standard and finish the calibration.
7. Display returns to Measurement window.



Manual Calibration

When the conductivity reading is outside calibration range of the automatic conductivity standards or when TDS or salinity is used, the tester will require manual adjustment.

1. Repeat steps 1 to 4 from "Automatic Calibration for Conductivity".
2. Press MENU/∨ to manually adjust the value to the desired reading.

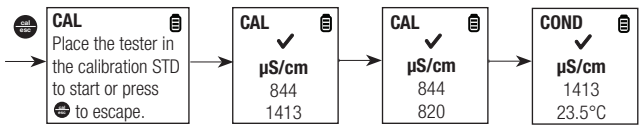
Note: The adjustment will decrease only, however the adjustment will eventually cycle to the highest available value after decreasing by 40% of the initial value.

3. Press HOLD/↵ to accept and finish the calibration when the desired value is selected.

Note: To abort calibration, press CAL/ESC to escape.

4. Once the calibration is finished and user has accepted the changes, measurement window will now show the calibrated reading.

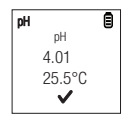
Note: The auto conductivity standards are 84 µS/cm, 1413 µS/cm & 12.88 mS/cm.



Measurement

1. Press ON/OFF (⏻) to power on the tester if needed.
2. Dip the electrode in about 2 cm to 3 cm into the test solution. Stir and let the reading stabilize. The timer icon will blink during this time. Once the reading is stabilized, the timer stops blinking and ✔ will appear to indicate the stability of the reading.

CAUTION: Testing dry samples is not accurate and can lead to sensor damage or breakage. Soils must be wet and free of particulates that may scratch the glass sensor. Excessive force into dry samples can cause glass breakage.

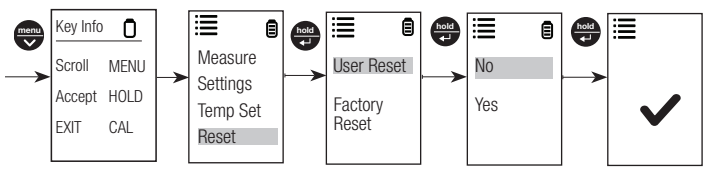


3. Note the value or press HOLD/↵ to freeze the reading. To release the reading, press HOLD/↵ again.
4. Press ON/OFF (⏻) for 3 seconds to turn off tester. If you do not press a button for 8.5 minutes, the tester will automatically shut off to conserve batteries.

User Reset

Reset to the user's default settings by using the User Reset function. Buffer selection and user temperature calibration are not affected by the user reset function.

1. Press MENU/∨ to enter setup window. Scroll down by pressing MENU/∨ to select Reset. Press HOLD/↵ to select Reset. The display shows User Reset and Factory Reset.
2. Press HOLD/↵ to select User Reset.
3. The display automatically shows No and Yes. Scroll down by pressing MENU/∨ to toggle between No and Yes.
4. Press HOLD/↵ to confirm either No or Yes. The display shows the User Reset option with a ✔.



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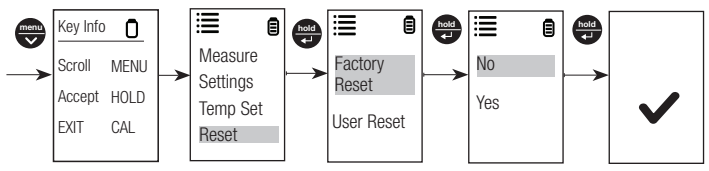
Factory Reset

Reset to the Factory Default Settings by using the Factory Reset function.

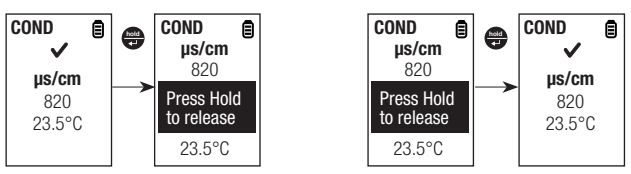
1. Press MENU/v to enter setup window. Scroll down by pressing MENU/v to select Reset. Press HOLD/↵ to select Reset. The display shows User Reset and Factory Reset.
2. Scroll down by pressing MENU/v to toggle between the resets. Press HOLD/↵ to select Factory Reset.
3. The display automatically shows No and Yes. Scroll down by pressing MENU/v to toggle between No and Yes.
4. Press HOLD/↵ to confirm either No or Yes. The display shows the Factory Reset option with a ✔.



HOLD Function

This feature lets you freeze the display for a delayed observation.

1. Press HOLD/↵ button to freeze the measurement.
2. Press HOLD/↵ again to release the measurement.



Sensor Maintenance

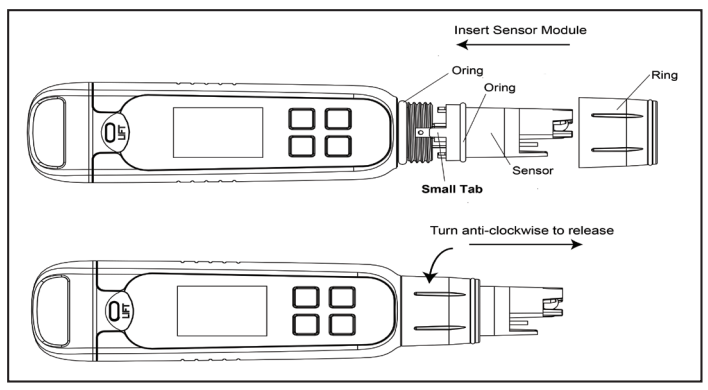
1. Always keep the sensor electrodes clean. Rinse the electrodes with de-ionized water and wipe them dry with clean cloth before storing with its protective cap. For cup type electrodes, remove the white plastic cup and insert to thoroughly clean viscous solutions. **Note:** Never scratch electrodes with a hard substance.
2. For better performance, soak the electrode in alcohol for 10 to 15 minutes and rinse with de-ionized water before starting any measurement process. This is to remove dirt and oil stains on the electrode, which may affect the accuracy of the measurements.

Sensor Replacement

You can replace the sensor module at a fraction of the cost of a new tester. When the tester fails to calibrate or gives fluctuating readings in calibration standards, you need to change the electrode.

1. With dry hands, grip the ring with sensor facing you. Twist the ring counterclockwise. Save the ring for later use.
2. Pull the old sensor module away from the tester.
3. Align the four tabs on the new module so that they match the four slots on the tester.
4. Gently push the module onto the slots to sit it in position. Push the smaller O-ring fully onto the new sensor module. Push the other O-ring over the module and thread it into place by firmly twisting clockwise.

Note: It is necessary that you recalibrate your tester prior to measurement after a sensor replacement.



Replacing the Batteries

The PCTSTestr 50 Pocket Tester uses four AAA 1.5 V batteries.

1. To remove the battery cover, see Figure 1. Clear the front catch and then the back catch, before sliding the cover off.
2. To remove the battery plate, push the center tab towards the front of the tester as shown in Figure 2. Once unlocked, remove the plate to access the batteries.
3. Invert the tester upside down to remove the batteries. Each side uses two AAA batteries. Orient each battery with positive terminal facing downward.
4. To lock the battery place, align the small tabs (Figure 3) into the guide ribs on the housing and then press down. See Figure 4.

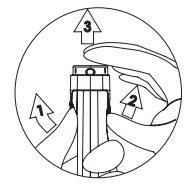


Fig. 1: Removing battery cover

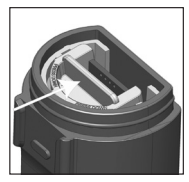


Fig. 2: Push to unlock

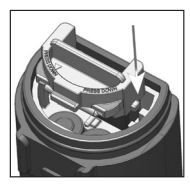


Fig. 3: Align tabs

Fig. 4: Push down to lock

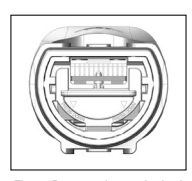


Fig. 5: Battery plate unlocked

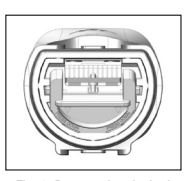


Fig. 6: Battery plate locked

Warranty

This instrument is supplied with a warranty against manufacturing defects for a period of one year from the date of purchase.

Return of Items

Authorization must be obtained from your distributor before returning items for any reason. When applying for authorization, please include information regarding the reason the item(s) are to be returned.

We reserve the right to make improvements in design, construction and appearance of products without notice. Prices are subject to change without notice.

Self-Diagnostic Messages

🔋	Batteries are weak and need replacement soon.
stable error	Appears when calibration is attempted but the reading is not yet stable. Wait for the reading to stabilize or manually confirm the calibration by pressing enter.
buffer error	The buffer is outside of the calibration range.
slope error	The 2nd and 3rd calibration point is not within 80% to 120% slope range.
over range	The reading is above the measuring range of tester.
under range	The reading is below the measuring range of tester.

Specifications

Specifications	PCTSTestr 50
pH	
pH range	–1.00 to 15.00 pH
Resolution	0.01 pH
Relative accuracy	±0.01 pH
Calibration points	Up to 3 points
Buffer set standard selection	USA: 4.01/7.00/10.01 NIST: 4.01/6.86/9.18
Calibration window	±1.00 pH
Calibration type	Point to point
Conductivity	
Conductivity range	0.0 to 200.0 µS, 200 to 2000 µS, 2.00 to 20.00 mS
Resolution	0.1 µS, 1 µS, 0.01 mS
Relative accuracy	±1% full scale
Normalization temperature	25.0ºC (77ºF)
Temperature co-efficient	0.0% to 10.0%
Calibration points	Up to 3 points
TDS	
TDS range	0.0 to 100.0 ppm, 100 to 1000 ppm, 0.10 to 10.00 ppt (TDS factor 0.5)
Resolution	0.1 ppm, 1 ppm, 0.01 ppt
Relative accuracy	±1% full scale
Calibration points	Up to 3 points
TDS factor	0.40 to 1.00 (selectable)
Salinity	
Salinity range	0.00 to 10.00 ppt
Resolution	0.10 ppt
Relative accuracy	±1% full scale
Calibration points	1

Specifications (cont.)	PCTSTestr 50
Temperature	
Temperature range	0 to 60°C (32.0 to 140.0°F)
Temperature resolution	0.1°C / 0.1°F
Temperature accuracy	From 0 to 50ºC (±0.5°C / ±0.9°F + 1 LSD); from 50 to 60°C (±1.0ºC / ±1.8°F + 1 LSD)
Temperature compensation	Yes (Automatic Temperature Compensation)
General	
Display	Graphics, dot matrix 80 x 100 pixel
Backlight	Yes, selectable (30 sec from last key press)
Auto off	8.5 minutes (from last key press)
Reset	User / Factory
Power requirement	Four AAA 1.5 V batteries
Battery life	>150 hours
Water proofing	IP67
Regulatory certifications	CE, FCC
Environmental Operating Conditions	
Ambient operating temperature	5 to 45°C / 41 to 113°F
Relative humidity	5% to 85% noncondensing
Storage temperature	–20 to 60°C / –4 to 140°F
Storage humidity	5% to 85% noncondensing

Accessories

Ordering Code	Product Description
35634-35	PCTSTestr 50 pocket tester with case, lanyard, and batteries
35634-37	Replacement sensor module for PCTSTestr 50
35634-09	Replacement sensor cap
09376-00	Replacement alkaline batteries; AAA, 1.5 V. Pack of 12
17101-45	NIST-traceable calibration with data for pocket testers

OAKTON® INSTRUMENTS

www.4oakton.com

1065O100_MAN_35634-35 August, 2017

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DR300

09/2021, Edition 5

User Manual
Manual de usuario
Manuel d'utilisation
Manual do Usuário
用户手册
使用手冊
ユーザーマニュアル
사용 설명서
คู่มือผู้ใช้

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3 Install the batteries on page 7
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6 Do a test on page 11
7 Show measurements on page 15
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11 Replacement parts and accessories on page 24

Section 1 Specifications

Specifications are subject to change without notice.

Specification	Details
Dimensions (W x H x D)	6.9 x 15.7 x 3.4 cm (2.7 x 6.2 x 1.3 in.)
Enclosure	IP67, waterproof at 1 m (3.3 ft) for 30 minutes when battery compartment is closed and locked.
Light source	Light emitting diode (LED)
Detector	Silicon photodiode
Display	LCD with backlight
Weight	0.25 kg (0.55 lb)
Power requirements	4 AAA batteries; approximate life of 5000 tests (use of backlight decreases this number) Rechargeable batteries are not recommended.
Operating environment	0 to 50 °C (32 to 122 °F), 0 to 90% relative humidity non-condensing
Storage temperature	–20 to 55 °C (–4 to 131 °F), 0 to 80% relative humidity non-condensing
Wavelength	Fixed wavelength ±2 nm, different for each model
Filter bandwidth	15 nm
Absorbance range	0 to 2.5 Abs
Sample cell	25 mm (10 mL) and 1 cm (10 mL)
Data storage	Last 50 measurements

Specification	Details
Bluetooth® [1]	Bluetooth® is on when the optional Hach Communication Dongle is installed.
Certifications	CE
Warranty	1 year (EU: 2 years)

Section 2 General information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

2.1 Safety information

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is soley responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

[1] The Bluetooth® word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc. and any use of such marks by HACH is under license.

2.1.1 Use of hazard information

⚠ DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

2.1.2 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

2.1.3 Certification

Canadian Radio Interference-Causing Equipment Regulation, ICES-003, Class B:

Supporting test records reside with the manufacturer.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de classe B répond à toutes les exigences de la réglementation canadienne sur les équipements provoquant des interférences.

FCC Part 15, Class "B" Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their expense. The following techniques can be used to reduce interference problems:

1. Move the equipment away from the device receiving the interference.
2. Reposition the receiving antenna for the device receiving the interference.
3. Try combinations of the above.

2.2 Product overview

This instrument is a portable filter photometer used for testing water.

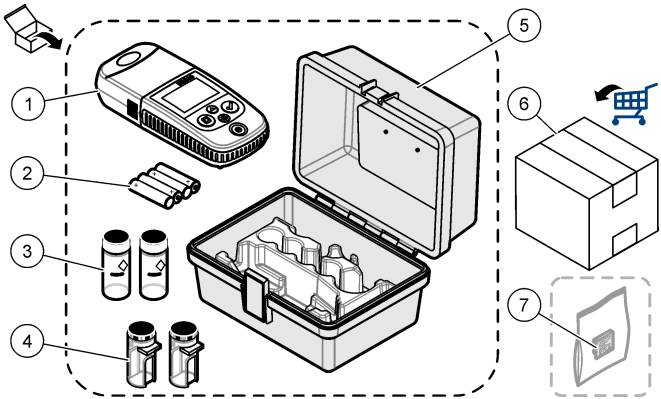
Note: *This instrument has not been evaluated to measure chlorine and chloramines in medical applications in the United States.*

2.3 Product components

Make sure that all components have been received. Refer to Figure 1. If any items are missing or damaged, contact the manufacturer or a

sales representative immediately. Figure 1 is an example and shows the parts supplied with LPV445.99.00110. Other instruments come with different components.

Figure 1 Product components



1 DR300	**5** Storage case
2 AAA alkaline batteries	**6** Reagents
3 Sample cells, 25 mm (10 mL), glass	**7** Hach Communication Dongle (optional, supplied separately)
4 Sample cells, 1 cm (10 mL), plastic	

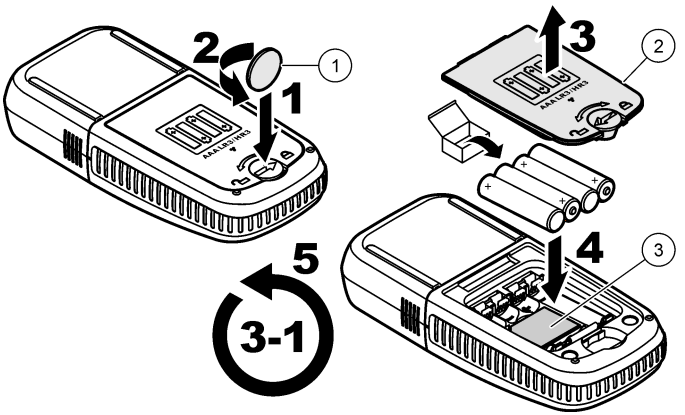
Section 3 Install the batteries

⚠ WARNING

Explosion hazard. Incorrect battery installation can cause the release of explosive gases. Be sure that the batteries are of the same approved chemical type and are inserted in the correct orientation. Do not mix new and used batteries.

Refer to Figure 2 to install the batteries. Then, push ⏻ to set the instrument to on.

Figure 2 Install the batteries



1 Coin	**3** Plastic insert for dongle[2]
2 Battery cover	

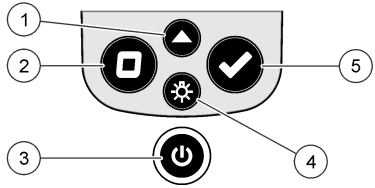
Section 4 User interface and navigation

4.1 Keypad description

Figure 3 shows the keypad and gives the key functions.

[2] Only remove the plastic insert to install the Hach Communication Dongle. Refer to the installation instructions supplied with the dongle.

Figure 3 Keypad

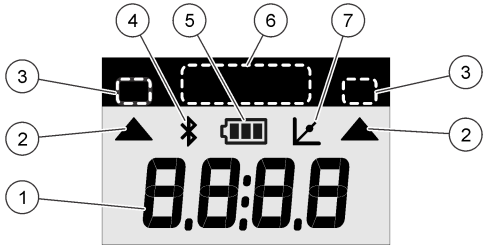


1 Range key: Selects the measurement range (e.g., LR or HR). Push and hold for 3 seconds to enter or exit menu mode. In menu mode, scrolls up or increases the value of the selected digit.	**4 Backlight key:** Sets the backlight to on and off. In menu mode, scrolls down or decreases the value of the selected digit.
2 Zero key: Sets the zero value before a measurement. In menu mode, goes back one menu level or moves the cursor to the previous digit.	**5 Read key:** Starts a sample measurement. In menu mode, selects the menu option shown or moves the cursor to the next digit.
3 Power key: Sets the power to on and off. Push and hold for 5 seconds to reset the instrument. The calibration is not deleted.	

4.2 Display description

Figure 4 shows the values and icons shown on the display.

Figure 4 Display



1 **Numeric display:** Measured value or menu options	**5** **Battery icon:** Battery power level. Flashes when the battery power level is low.
2 **Range icon:** Points to the selected measurement range	**6** Parameter and measurement ranges
3 Measurement ranges or parameters	**7** **Calibration adjusted icon:** The factory default calibration was adjusted or a user-entered calibration curve was entered.
4 **Bluetooth® icon:** Bluetooth® is on[3].	

Section 5 Set the time

Set the time (24-hour format).

1. Push and hold ▲ for 3 seconds to enter menu mode.
   The time shows (or 00:00).
2. Push ✔ to set the time.
3. Push the ▲ or ☼ to change the number that flashes. Push ✔ to go to the next digit. Push ◘ to go to the previous digit.

[3] Shows when the Hach Communication Dongle is installed.

Section 6 Do a test

⚠ DANGER

Chemical or biological hazards. If this instrument is used to monitor a treatment process and/or chemical feed system for which there are regulatory limits and monitoring requirements related to public health, public safety, food or beverage manufacture or processing, it is the responsibility of the user of this instrument to know and abide by any applicable regulation and to have sufficient and appropriate mechanisms in place for compliance with applicable regulations in the event of malfunction of the instrument.

⚠ DANGER

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

⚠ CAUTION

Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

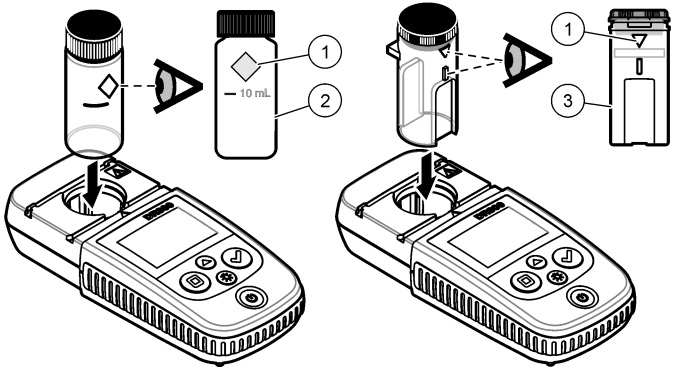
The generic steps to do a test follow.

To do a test for a specific parameter (e.g., chlorine), download the test procedure from the manufacturer's website. Refer to Download a test procedure on page 14.

1. Push ▲ to select the applicable measurement range (e.g., LR or HR).
2. Prepare the blank. Refer to the test procedure.
3. Clean the sample cell with a no-lint cloth.
4. Insert the blank sample cell into the cell holder. Make sure to install the blank sample cell in the correct and consistent orientation so that the results are more repeatable and precise. Refer to Figure 5.
5. Install the instrument cap over the cell holder. Refer to Figure 6.

6. Push ◘ to set the instrument zero.
7. Remove the blank sample cell.
8. Prepare the sample. Refer to the test procedure.
9. Clean the sample cell with a no-lint cloth.
10. Insert the sample cell into the cell holder. Make sure to install the sample cell in the correct and consistent orientation so that the results are more repeatable and precise. Refer to Figure 5.
11. Install the instrument cap over the cell holder. Refer to Figure 6.
12. Push ✔. The display shows the results in concentration units or absorbance.
    Note: *The result flashes if the result is less or more than the instrument range.*
13. Remove the sample cell from the cell holder.
14. Immediately empty and rinse the sample cell. Rinse the sample cell and cap three times with deionized water (or distilled water).
    Note: *As an alternative, use tap water to rinse the sample cell if the samples measured have a higher concentration than the tap water.*

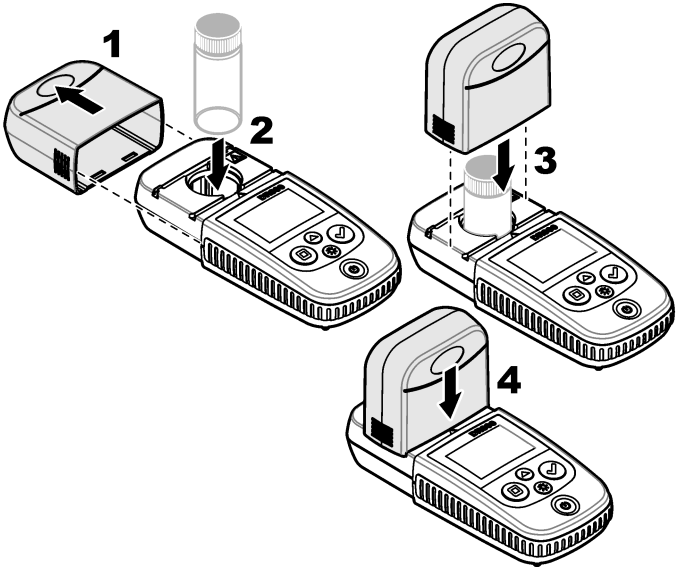
Figure 5 Sample cell orientation



1 Orientation mark[4]	**2** Sample cell, 25-mm (10 mL), glass[5]	**3** Sample cell, 1-cm (10 mL), plastic[6]

[4] Some variants of the instrument have sample cells without an orientation mark.
[5] Use the glass sample cell for low-range chlorine tests.
[6] Use the plastic sample cell for high-range chlorine tests.

Figure 6 Install the instrument cap over the cell holder



6.1 Download a test procedure

1. Go to http://www.hach.com.
2. Enter "DR300" in the Search box.
3. Select the "Downloads" option on the left side in the "Search Type" box.
4. Scroll down to "Methods/Procedures".
5. Click the link for the applicable test procedure to download it.

Section 7 Show measurements

Note: *The instrument saves a maximum of 50 measurements. After 50 measurements are done, new measurements replace the oldest measurements.*

1. Push and hold ▲ for 3 seconds.
2. Push ▲ until "rCL" (recall) shows, then push ✔.

   "– 01 –" shows. Measurement 01 is the last measurement done.
3. Push ✔ to scroll forward.

   The measurement number is followed by the measurement value and then the time.
4. To go to a measurement number, push ✔ until a measurement number shows, then push ▲ or ☼.

   Note: *Measurements cannot be deleted.*
5. Push and hold ▲ for 3 seconds to go back to measurement mode.

Section 8 Calibration

This instrument is calibrated at the factory. No user calibration is necessary.

8.1 Standard calibration adjust

Use the standard calibration adjust (SCA) option when a calibration must be adjusted to meet regulatory requirements. The factory calibration is adjusted slightly with the standard calibration adjust (SCA) option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are slight variations in the reagents or instruments.

Note: *For instruments with factory-calibrated ranges or methods, the standard calibration adjust (SCA) feature is disabled when a user-entered calibration is entered into the instrument. To set SCA back to on, set the instrument to the factory default calibration. Refer to* Set to the factory default calibration on page 20.

8.1.1 Do a standard calibration adjust

1. Complete the test procedure for the range to calibrate. For the sample, use the standard solution concentration given in the test procedure documentation.

   Note: *If a standard solution concentration is not given in the test procedure documentation, a different known standard can be used.*
2. When the test procedure is completed, push and hold ▲ for 3 seconds.
3. Push ▲ until “SCA” shows, then push ✔.

   The display shows the standard calibration adjust value.
4. If a different known standard is used, enter the value of the standard:

   a. Push ▲ until "Edit" shows, then push ✔.
   b. Enter the value of the standard.

      Push the ▲ or ☼ to change the number that flashes. Push ✔ to go to the next digit. Push ☐ to go to the previous digit.
5. Push ✔ to add the standard calibration adjust value to the factory calibration curve.

8.1.2 Set the standard calibration adjust to off

To use the factory default calibration again, set standard calibration adjust (SCA) to off.

1. Push and hold ▲ for 3 seconds to enter menu mode.
2. Push ▲ until "SCA" shows, then push ✔.
3. Push ▲ until "OFF" shows, then push ✔.

Note: *To set the SCA function to on again, do a standard calibration adjust.*

8.2 User-entered calibration curve

This instrument accepts a user-prepared calibration curve. The calibration curve can be from 0 to 2.5 absorbance. Make sure that the calibration curve includes standard values that are less and more than the range of interest.

The instrument range will be the same as the calibration range. For example, when the standards that are used are 1.00, 2.00 and 4.00. The instrument range is 1.00 to 4.00.

There are two options to enter a user calibration curve:

- **Enter a calibration curve with standards**—The standard solution values are entered with the keypad and the absorbance values are measured.
- **Enter a calibration curve with the keypad**—The standard solution values and absorbance values are entered with the keypad.

Note: *If the instrument is set to off or the instrument power is removed before a user-entered calibration curve is completed, the calibration curve is not saved. The instrument automatically switches off in user-entered calibration entry mode after 60 minutes of no activity. User-entered calibrations are completed when the user goes out of calibration (cal) mode or edit mode.*

8.2.1 Enter a calibration curve with standards

⚠ WARNING

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

⚠ CAUTION

Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

Note: *As an alternative, deionized water can be used for the blank unless the sample is significantly more turbid or has more color than deionized water.*

1. Push ▲ to set the instrument to the range to calibrate (e.g., LR or HR).
2. Prepare the blank. Refer to the test procedure.
3. Clean the sample cell with a no-lint cloth.
4. Set the instrument to zero.
   a. Insert the blank sample cell in the cell holder.

b. Install the instrument cap over the cell holder.

c. Push ☐. The display shows "- - - -", then "0.00".

5. Push and hold ▲ for 3 seconds to enter menu mode.

6. Push ▲ until "USEr" shows, then push ✔.

7. Push ▲ until "CAL" shows, then push ✔.

8. When "S0" shows on the display, push ✔.

9. Enter 00.00 (or 000.0) for the blank value.

Push the ▲ or ☼ to change the number that flashes. Push ✔ to go to the next digit. Push ☐ to go to the previous digit.

10. When "A0" shows on the display, push ✔ to measure the absorbance of the blank.

The display shows the absorbance value for "S0".

11. Remove the sample cell from the cell holder.

12. Prepare the sample. Refer to the test procedure. For the sample, use the standard solution concentration given in the test procedure documentation.

13. Clean the sample cell with a no-lint cloth.

14. Push ☼ to show "S1" (or "Add"), then push ✔.

15. Enter the concentration value of the first calibration standard, then push ✔.

16. When "A1" shows on the display, do the steps that follow to measure the absorbance:

a. Insert the reacted standard sample cell in the cell holder.

b. Install the instrument cap over the cell holder.

c. Push ✔. The display shows the absorbance value for "S1".

17. The calibration is completed with two calibration points. If additional standards are necessary for calibration:

Do steps 11 – 16 again to measure more calibration standards.

18. Remove the sample cell from the cell holder.

19. Immediately empty and rinse the sample cell. Rinse the sample cell and cap three times with deionized water (or distilled water).

    Note: *As an alternative, tap water can be used to rinse the sample cell if the concentration of the parameter in the tap water is less than the samples measured.*

20. Push and hold ▲ for 3 seconds to go back to measurement mode.

8.2.2 Enter a calibration curve with the keypad

At least two data pairs are necessary to enter a user-prepared calibration curve. A concentration value and the absorbance value for the given concentration is necessary for each data pair. A maximum of 10 data pairs can be entered.

1. Push ▲ to set the instrument to the range to calibrate (e.g., LR or HR).
2. Push and hold ▲ for 3 seconds to enter menu mode.
3. Push ▲ until "USEr" shows, then push ✔.
4. Push ▲ until "Edit" shows, then push ✔.
5. When "S0" shows on the display, push ✔.
6. Enter the first data pair.

   The first data pair is S0 (concentration value) and A0 (absorbance value).

   - Push ▲ or ☼ to change the number that flashes.
   - Push ✔ to go to the next digit.
   - Push ◘ to go to the previous digit.
7. Do steps 5 and 6 again to enter the second data pair (S1 and A1).
8. The calibration is completed with two data pairs. If additional data pairs are necessary for calibration:

   a. When “Add” shows, push ✔.
   b. Do steps 5 and 6 again to enter more data pairs.
9. Push and hold ▲ for 3 seconds to go back to measurement mode.

8.2.3 Set to the factory default calibration

To remove a user-entered calibration curve from the instrument and use the factory calibration, do the steps that follow:

1. Push and hold ▲ for 3 seconds to enter menu mode.
2. Push ▲ until "USEr" shows, then push ✔.
3. Push ▲ until "dFL" (default) shows, then push ✔.

Section 9 Maintenance

⚠ CAUTION

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

NOTICE

Do not disassemble the instrument for maintenance. If the internal components must be cleaned or repaired, contact the manufacturer.

9.1 Clean the instrument

Clean the exterior of the instrument with a moist cloth and a mild soap solution and then wipe the instrument dry as necessary.

9.2 Clean the sample cells

⚠ CAUTION

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

⚠ CAUTION

Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

Most laboratory detergents are used at recommended concentrations. Neutral detergents, such as Liquinox, are safer to use when regular cleaning is necessary. To decrease the cleaning times, increase the temperature or use an ultrasonic bath. To complete the cleaning, rinse a few times with deionized water and then let the sample cell air dry. Sample cells may also be cleaned with acid, followed by a thorough rinse with deionized water.

Note: *Always use acid to clean sample cells that were used for low-level metal tests.*

Special cleaning methods are necessary for individual procedures. When a brush is used to clean sample cells, take extra care to avoid scratches on the interior surfaces of the sample cells.

9.3 Replace the batteries

Replace the batteries when the battery power level is low. Refer to Install the batteries on page 7.

Section 10 Troubleshooting

Error	Description	Solution
E-00	No Zero	In user calibration mode, a standard solution was measured before the instrument zero was set. Measure a blank solution to set the instrument to zero.
E-01	Ambient light error[7]	There is ambient light in the cell holder. Make sure that the instrument cap is fully installed on the cell holder. Refer to Do a test on page 11.
E-02	LED error[7]	The LED (light source) is out of regulation. Replace the batteries. Make sure that the LED in the cell holder comes on when ✔ or ☐ is pushed.

[7] When an E-01 or E-02 error occurs on a measurement, the display shows "_.__". The decimal place depends on the chemistry. If the E-01 or E-02 error occurs while the instrument is set to zero, set the instrument to zero again.

Error	Description	Solution
E-03	Standard adjust error	• The measured value of the standard solution is more than the adjustment limits. Prepare a fresh standard. • The standard solution is not within the concentration range that can be used for standard calibration adjust. Prepare a standard with a value at or near the recommended concentrations given in the procedure. • Make sure that the concentration of the standard solution is entered correctly.
Reading flashes followed by E-04	The reading is more or less than the instrument range.[8]	If the reading is less than the instrument range, make sure that the instrument cap is fully installed on the cell holder. Measure a blank. If the blank reading is not zero, set the instrument to zero again.
		If the reading is more than the instrument range, identify if there is a light blockage in the cell holder. Dilute the sample. Do the test again.
E-06	Absorbance error	The absorbance value is not correct or the user-entered calibration curve has fewer than two points. Enter or measure the absorbance value again.
E-07	Standard value error	The standard solution concentration is equal to another standard solution concentration that is already entered in the user-entered calibration curve. Enter the correct standard concentration.
E-09	Flash error	The instrument is not able to save data. Push and hold ⏻ for 5 seconds to reset the instrument.
E-10	Environment temperature too high or too low	The ambient temperature is out of range. Use the instrument only in the specified operating conditions. Refer to Specifications on page 3.

[8] The value that flashes will be 10% over the upper test range limit.

Error	Description	Solution
E-12	Low battery power	Battery power is too low. Replace the batteries. Refer to Install the batteries on page 7.
E-13	Parameter load failure	The memory of the instrument is defective. Contact technical support.
E-14 followed by "_.__" or "0" if no zero was present	Zero measurement invalid	The zero measurement is too low. Use a sample cell filled with water and try again. If the error continues, contact technical support.
E-15 followed by "_.__"	Absorbance too high	Identify if there is a light blockage in the cell holder. Clean the cell holder. Dilute the sample. Do the test again. ***Note:*** *This instrument can not read absorbance values higher than 3.5 Abs.*
E-20	Signal measurement out of range	There is too much light on the light detector. Make sure that the instrument cap is fully installed on the cell holder. Do the test again. If the error continues, contact technical support.
E-21	Signal measurement unstable	There is an unstable signal on the light detector. There is too much or unstable ambient light. Make sure that the instrument cap is fully installed on the cell holder. Do the test again. If the error continues, contact technical support.
E-22	Hardware error	The electronic system is defective. Contact technical support.

The following errors can occur immediately after an instrument update.

Error	Description	Solution
E-30	No application	There was an error during the application update. A valid application was not found on the instrument. Update the instrument again.
E31	Bootloader update failed	There was an error during the transmission of the bootloader update. Update the bootloader again.

Error	Description	Solution
E-32	Application update failed	There was an error during the transmission of the application update. Update the instrument again.
E-66	Update failed	The instrument is defective. Contact technical support.

Section 11 Replacement parts and accessories

⚠ WARNING

Personal injury hazard. Use of non-approved parts may cause personal injury, damage to the instrument or equipment malfunction. The replacement parts in this section are approved by the manufacturer.

Note: *Product and Article numbers may vary for some selling regions. Contact the appropriate distributor or refer to the company website for contact information.*

Replacement parts

Description	Quantity	Item no.
AAA batteries, alkaline	4/pkg	4674300
Instrument cap	1	LPZ445.99.00006
Battery cover	1	LPZ445.99.00007
Sample cell, 25 mm (10 mL), glass	6/pkg	2427606
Sample cell, 1 cm (10 mL), plastic	2/pkg	4864302

Accessories

Description	Quantity	Item no.
Hach Communication Dongle	1	LPV446.99.00012
Soft-sided case/holster	1	5953100

APPENDIX G

Confined Space Entry Program

Confined Space Entry Written Program

Purpose

The purpose of this plan is to establish a program and procedures for the safe entry into confined spaces.

This program supports compliance with Occupational Safety and Health Administrative Permit Required Confined Space Entry Program as found in 29 CFR 1910.146. This plan applies to all city employees. Contractors working at city facilities will be covered by the contractor procedures of this program and will be expected to follow all requirements.

Definitions

Confined Space: An area which:

- has a size and shape large enough for employees to enter
- has limited entrances and exits
- is not designed for people to work in continuously

Permit-Required Confine Space: According to the OSHA Standard, this is a space which meets all of the above conditions and had one or more of the following hazards:

- *Atmospheric hazards,* which can be asphyxiating, toxic, flammable or explosive
- *Engulfment hazards*, which occur when someone is trapped or enveloped by a dry, bulk material such as grains, soil or powdered cement
- *Configuration hazards*, in which the size or shape of the space can trap an employee or make escape or rescue difficult
- *Energy hazards*, which can happen if there is contact with electrical equipment, steam or other sources of heat inside the space. (Equipment such as augers or mixers must

be locked out-see "Step 4: Developing Pre-Entry Planning and Confined Space Entry Procedures")
- *Other serious hazards*, such as falls, burns, or high noise levels

Entry Into A Confined Space: OSHA defines entry as any part of an employee's body going through the opening into the space. Even just a hand going into the space is considered entry.

IDLH: An OSHA hazard classification-"Immediately Dangerous to Life & Health." Toxic atmosphere that are immediately fatal are considered IDLH.

Intrinsically Safe: A designation of the manufacturer's label placed on equipment, indicating that it is designed to be safely used for specific kind of confined space.

Responsibilities

The Program Administrator:

This person is responsible for issuing and administering this program and making sure that the program satisfies the requirements of all applicable Federal, State or Local confined space entry requirements.

The Entry Supervisor: Supervisor (See safety file for list)
This person is responsible for verifying the purpose for each entry into a confined space and issuing permits to protect entrants assigned to perform work. The permit will be issued according to the permit procedures listed, including the following:

- Ensuring that all assigned entrants have current training in the procedures and precautions for work to be performed
- Informing contractors of the cities confined space entry program requirements and of the potential hazards of each space to be entered
- Verifying that all entry equipment is maintained and/or calibrated according to the manufacturer's specifications and the company's preventive maintenance procedures

The Authorized Entrants: All Trained Personnel (See safety file for list)

These people are responsible for:

- Knowing the hazards that may be faced during entry, including information of how hazardous exposure may occur, and the signs, symptoms and severity of over exposure
- Properly using any equipment needed to safely enter the space, following warnings given by the attendant and exiting the space immediately when told to do so

The Attendant: All Trained Personnel (See attached list)

This person is assigned to monitor the entrants while they are working in the space and is responsible for:

- Knowing the hazards that may be faced during the entry
- Knowing symptoms and health effects if overexposure occurs
- Ordering the entrants to evacuate the space if the attendant detects a new hazard for unusual behavior in the entrants
- Maintaining an accurate count of the number of authorized entrants in the space
- Remaining outside the space during entry operations until relieved by another attendant
- Maintaining communication with authorized entrants to monitor their work activities and to alert them if evacuation becomes necessary
- Calling for rescue and other emergency services as soon as the attendant recognizes that the entrants may need assistance to escape from the space
- Keeping unauthorized persons from entering the space or interfering with the entry process
- Initiating or performing non-entry rescues as outlined in the rescue plan
- Performing no other activities which may interfere with primary job of monitoring safety and condition of those people inside the confined space

The Air Monitor Technician: All Trained Personnel (See safety file for list)

This person is responsible for:

- Knowing how to calibrate and operate air monitoring equipment
- Understanding what airborne hazards exist or have the potential to exist at the site
- Identifying equipment and methods for testing at the site
- Determining when equipment is malfunctioning
- Providing appropriate equipment maintenance

Program Activities

Identifying Confined Spaces:

- Not all spaces are not city owned.
- A permit is required for all manholes.
- Employees will be notified where the confined spaces are located during confined space entry training.

Hazard Testing Before Entry Into Confined Space

- All confined spaces will be tested before entry, using properly calibrated and approved equipment.
- If the hazard level cannot be determined by testing. An Immediately Dangerous to Life Health situation shall be assumed
- The air will be tested for oxygen levels and flammable gases and vapors.

Eliminating Hazards

- Mechanical ventilation will be provided when necessary.
- Protective equipment and respirators are to be used only when normal cleaning and ventilating procedures fail to reduce the hazard to safe levels. (this will be contracted to qualified personnel)

Confined Space Entry Team

- During a confined space entry, there will always be a minimum of one attendant and one entrant.
- One attendant must be first aid and CPR trained.
- One attendant must be able to physically remove an injured entrant from the confined space in case of emergency.

Non-Entry Rescue

- A hoist or other mechanical device for personnel removal will be used for all spaces in excess of five (5) feet on depth. This equipment will be used in situations where it may be difficult to rescue the entrant.
- First aid and any necessary rescue equipment shall be readily available at the site.

Lockout/Tagout

- Connecting pipelines will be blanked off or separated prior to entry.
- All lockout/tagout procedures shall be followed in securing electrical systems, machinery, and pressure systems and rotating equipment.

Other

- If welding or cutting is to be performed in a confined space, local exhaust ventilation will be provided. A hot work permit will be completed and attached to the confined space entry permit.
- The SDS for hazardous materials being used in a confined space will be incorporated in the confined space entry permit.
- Explosion-proof lighting shall be used in confined spaced unless atmospheric tests have proven that the space is non-explosive.

Training

- Training will be provided for all employees involved with confined space entries.
- Training will be updated as necessary to ensure safe entries.
- Training records will be maintained on forms found in the Recordkeeping section.

Attachments

Record keeping

- Confined Space Entry Training Log
- Confined Space Entry Permit
- Confined Space Entry Equipment List
- Confined Space Entry Emergency Information
- Confined Space Entry Procedure Checklist

APPENDIX H

System Vulnerability Factor Inventory

Table H-1. Outfall Catchment System Vulnerability Factor (SVF) Inventory
Cambridge, Massachusetts Revision Date: 07/01/2026

Outfall ID	Receiving Water	1 History of SSOs*	2 Common or Twin Invert Manholes	3 Common Trench Construction	4 Storm/Sanitary Crossings (Sanitary Above)	5 Sanitary Lines with Underdrains	6 Inadequate Sanitary Level of Service	7 Areas Formerly Served by Combined Sewers	8 Sanitary Infrastructure Defects	9 SSO Potential In Event of System Failures	10 Sanitary and Storm Drain Infrastructure >40 years Old	11 Septic with Poor Soils or Water Table Separation	12 History of BOH Actions Addressing Septic Failure
D02 Lechmere Canal	Charles River	No	No	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D03B Museum Way	Charles River	Yes	No	No	No	Data Not Available	No	No	Yes	No	Yes	No	No
D03C North Point	Charles River	No	No	No	No	No	No	No	No	Yes	No	No	No
D04 Main St	Charles River	No	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D05 Wadsworth St	Charles River	No	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No
D06 Ames St	Charles River	No	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D07 Broad Canal	Charles River	Yes	Yes	Yes	Yes	Data Not Available	No	Yes	Yes	No	Yes	No	No
D08 Mass Ave @ Mem Dr	Charles River	Yes	Yes	No	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D09 Danforth St	Charles River	No	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D10 Endicott St	Charles River	Yes	Yes	Yes	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D11 Amesbury St	Charles River	Yes	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D11B Audrey St	Charles River	Yes	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D12 Talbot St	Charles River	Yes	Yes	Yes	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D13 Lechmere Canal	Charles River	Yes	No	No	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D15 Pearl St	Charles River	No	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D16 Pleasant St	Charles River	Yes	Yes	Yes	Yes	Data Not Available	No	Yes	Yes	No	Yes	No	No
D17A Western Ave	Charles River	No	Yes	No	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D18 Higham St	Charles River	No	No	No	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D19 Flagg St	Charles River	Yes	Yes	Yes	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D21 Dewolfe St	Charles River	No	Yes	No	Yes	Data Not Available	No	Yes	Yes	No	Yes	No	No
D25 JFK West	Charles River	Yes	No	Yes	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D27 University Rd	Charles River	Yes	No	No	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D28 Brewer St	Charles River	Yes	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D30 Willard St	Charles River	No	Yes	Data Not Available	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D31 Sparks St	Charles River	Yes	Yes	Yes	Yes	Data Not Available	No	No	Yes	No	Yes	No	No
D33 Blanchard Rd @ Wellington	Alewife Brook	No	No	No	No	Data Not Available	No	Yes	Yes	Yes	Yes	No	No
D33A Blanchard Rd	Alewife Brook	No	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D34 Normandy Terr	Alewife Brook	Yes	Yes	Yes	Yes	Data Not Available	No	No	Yes	No	Yes	No	No
D36 Alewife Stormwater Wetland	Alewife Brook	Yes	Yes	Yes	No	Data Not Available	No	Yes	Yes	Yes	Yes	No	No
D38 N of CambridgePark Dr	Alewife Brook	Yes	Yes	No	No	Data Not Available	No	No	Yes	No	Yes	Yes	No
D40 Harrison Ave	Alewife Brook	Yes	Yes	Yes	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D44 Matignon Rd	Alewife Brook	No	Yes	Yes	No	Data Not Available	No	No	Yes	No	Yes	No	No
D46 Acorn Park Dr	Alewife Brook	No	No	No	No	No	No	No	Yes	Yes	No	No	No
D50 Cemetery Drainage 237	Charles River	No	No	No	No	Data Not Available	No	No	Yes	No	Yes	Yes	No
D52_1 Russell Field	Alewife Brook	No	No	No	No	Data Not Available	No	No	No	No	No	No	No
D52_2 Russell Field	Alewife Brook	No	No	No	No	Data Not Available	No	No	No	No	No	No	No
D53 Binney St	Charles River	Yes	Yes	No	No	Data Not Available	No	Yes	Yes	No	Yes	No	No
D55 River St	Charles River	Yes	No	No	No	Data Not Available	No	No	Yes	No	Yes	No	No
IC-23 JFK East outgoing to DCR	Charles River	No	No	No	No	Data Not Available	No	No	Yes	No	Yes	No	No
IC-51A West Kendall St - outgoing	Charles River	No	Yes	No	No	Data Not Available	No	No	Yes	No	Yes	No	No
IC-51B East Kendall St - outgoing to	Charles River	No	Yes	No	No	Data Not Available	No	No	Yes	No	Yes	No	No

*areas that have sewer pipes with flat slopes, restrictions and FOG issues requiring regular maintenance that could contribute to SSO issues

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Common or twin-invert manholes serving storm and sanitary sewer alignments
3. Common trench construction serving both storm and sanitary sewer alignments
4. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
5. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
6. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
7. Areas formerly served by combined sewer systems
8. Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations
9. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
10. Any sanitary sewer and storm drain infrastructure greater than 40 years old
11. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
12. History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

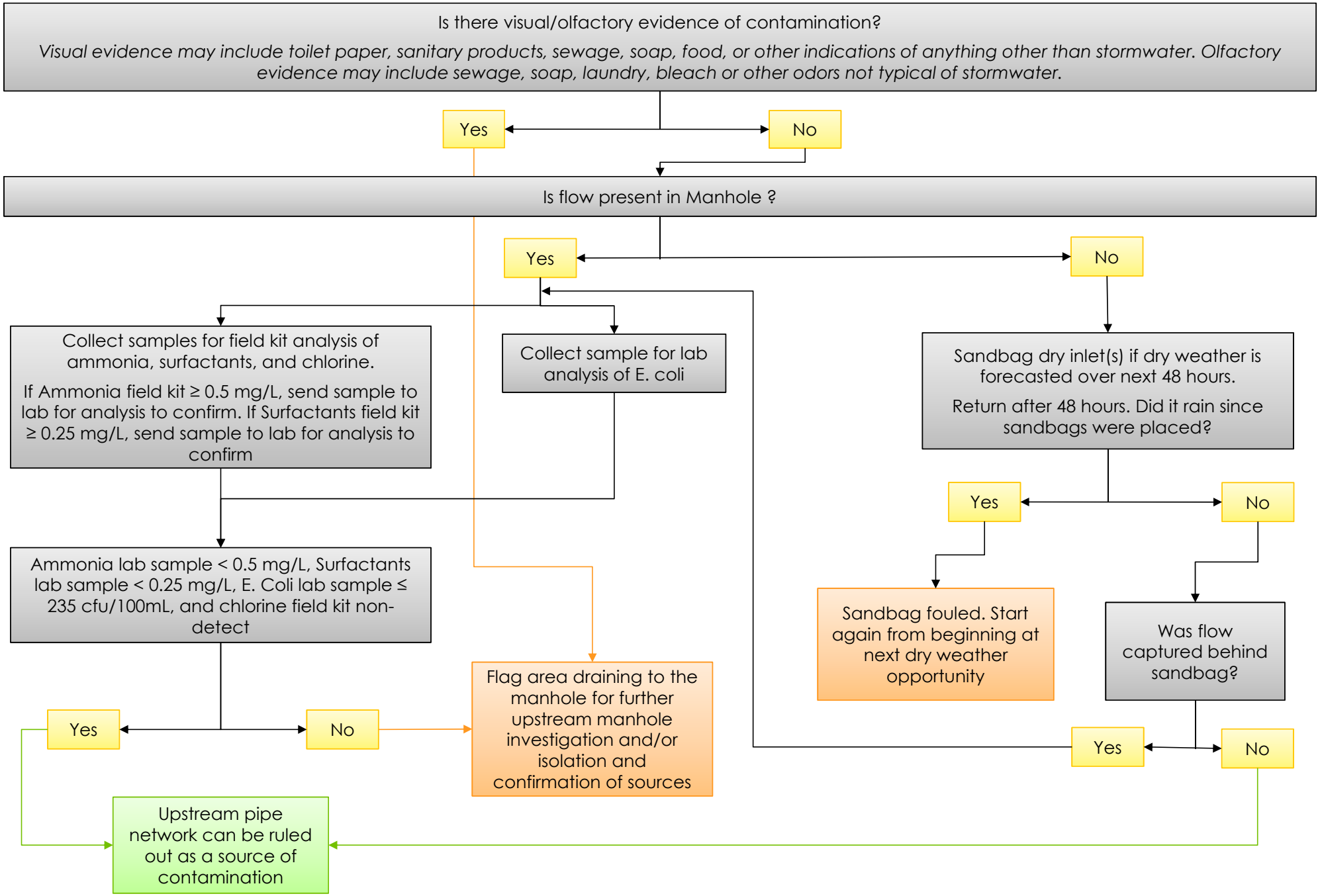
APPENDIX I

Source Isolation and Confirmation Methods: Instructions, Manuals, and SOPs

1. Manhole Inspection Protocol
2. SOP for Locating Illicit Discharges
3. EPA New England Bacterial Source Tracking Protocol

Protocol for Dry Weather Manhole Inspections

Proceed after a minimum of 24 hours of dry weather (less than 0.1" of rain). Recommend 48-72 hours when possible.



SOP 10: LOCATING ILLICIT DISCHARGES

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater unless the discharge is defined as an allowable non-stormwater discharge under the 2003 Massachusetts MS4 Permit. Illicit discharges may enter the engineered storm drain system through direct or indirect connections, such as: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to receiving streams.

Illicit discharges can be located by several methods, including routine dry weather outfall inspections and catch basin inspections, which are described in detail in SOP 1, "Dry Weather Outfall Inspection" and SOP 3, "Catch Basin Inspection and Cleaning", respectively, as well as from citizen reports.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to prohibit the connection of non-stormwater discharges into the storm drain system. The authority or department for addressing illicit discharge reports would be clearly identified in the municipality's legal authority. In Massachusetts, this is typically a combination of the Board of Health, the Department of Public Works (or Highway Department), and the local sanitary sewer department or commission. In some communities, the Conservation Commission may also play a role. This SOP refers to "appropriate authority" generically to reflect differences in how municipalities have identified these roles.

Identifying Illicit Discharges

The following are often indicators of an illicit discharge from stormwater outfall:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator of disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicator of the cross-connection of a sewer service.
7. Orange staining: indicator of high mineral concentrations.

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in

a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant but should be noted.

Citizen Call in Reports

Reports by residents and other users of a water body can be effective tools in identifying the presence of illicit discharges. Many communities have set up phone hotlines for this purpose, or have provided guidance to local police departments and dispatch centers to manage data reported in this manner. Municipal employees and the general public should receive education to help identify the signs of illicit discharges and should be informed how to report such incidents.

When a call is received about a suspected illicit discharge, the attached IDDE Incident Tracking Sheet shall be used to document appropriate information. Subsequent steps for taking action to trace, document, and eliminate the illicit discharge are described in the following sections.

Potential illicit discharges reported by citizens should be reviewed on an annual basis to locate patterns of illicit discharges, identify high-priority catchments, and evaluate the call-in inspection program.

Tracing Illicit Discharges

Whenever an illicit discharge is suspected, regardless of how it was identified, the attached IDDE Incident Tracking Sheet should be utilized. The Incident Tracking Sheet shall be provided to the appropriate authority (i.e., Board of Health, Department of Public Works, etc.), which shall promptly investigate the reported incident.

If the presence of an illicit discharge is confirmed by the authority, but its source is unidentified, additional procedures to determine the source of the illicit discharge should be completed.

1. Review and consider information collected when illicit discharge was initially identified, for example, the time of day and the weather conditions for the previous 72 hours. Also consider and review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to your system map, such as GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in SOP 13, "Water Quality Screening in the Field". This may include using field test kits or instrumentation, or collecting analytical samples for full laboratory analysis.
5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on the IDDE Incident Tracking Sheet as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example if the illicit discharge is present in catch basin 137

but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of the illicit discharge could not be determined by this survey, consider using dye testing, smoke testing, or closed-circuit television inspection (CCTV) to locate the illicit discharge.

Dye Testing

Dye testing is used to confirm a suspected illicit connection to a storm drain system. Prior to testing, permission to access the site should be obtained. Dye is discharged into the suspected fixture, and nearby storm drain structures and sanitary sewer manholes observed for presence of the dye. Each fixture, such as sinks, toilets, and sump pumps, should be tested separately. A third-party contractor may be required to perform this testing activity.

Smoke Testing

Smoke testing is a useful method of locating the source of illicit discharges when there is no obvious potential source. Smoke testing is an appropriate tracing technique for short sections of pipe and for pipes with small diameters. Smoke added to the storm drain system will emerge in connected locations. A third-party contractor may be required to perform this testing activity.

Closed Circuit Television Inspection (CCTV)

Televised video inspection can be used to locate illicit connections and infiltration from sanitary sewers. In CCTV, cameras are used to record the interior of the storm drain pipes. They can be manually pushed with a stiff cable or guided remotely on treads or wheels. A third-party contractor may be required to perform this testing activity.

If the source is located, follow steps for removing the illicit discharge. Document repairs, new sanitary sewer connections, and other corrective actions required to accomplish this objective. If the source still cannot be located, add the pipe segment to a future inspection program.

This process is demonstrated visually on the last page of this SOP.

Removing Illicit Discharges

Proper removal of an illicit discharge will ensure it does not recur. Refer to Table SOP 10-1, attached for, for examples of the notification process.

In any scenario, conduct a follow up inspection to confirm that the illicit discharge has been removed. Suspend access to the storm drain system if an "imminent and substantial danger" exists or if there is a threat of serious physical harm to humans or the environment.

Attachments

1. Illicit Discharge Incident Tracking Sheet

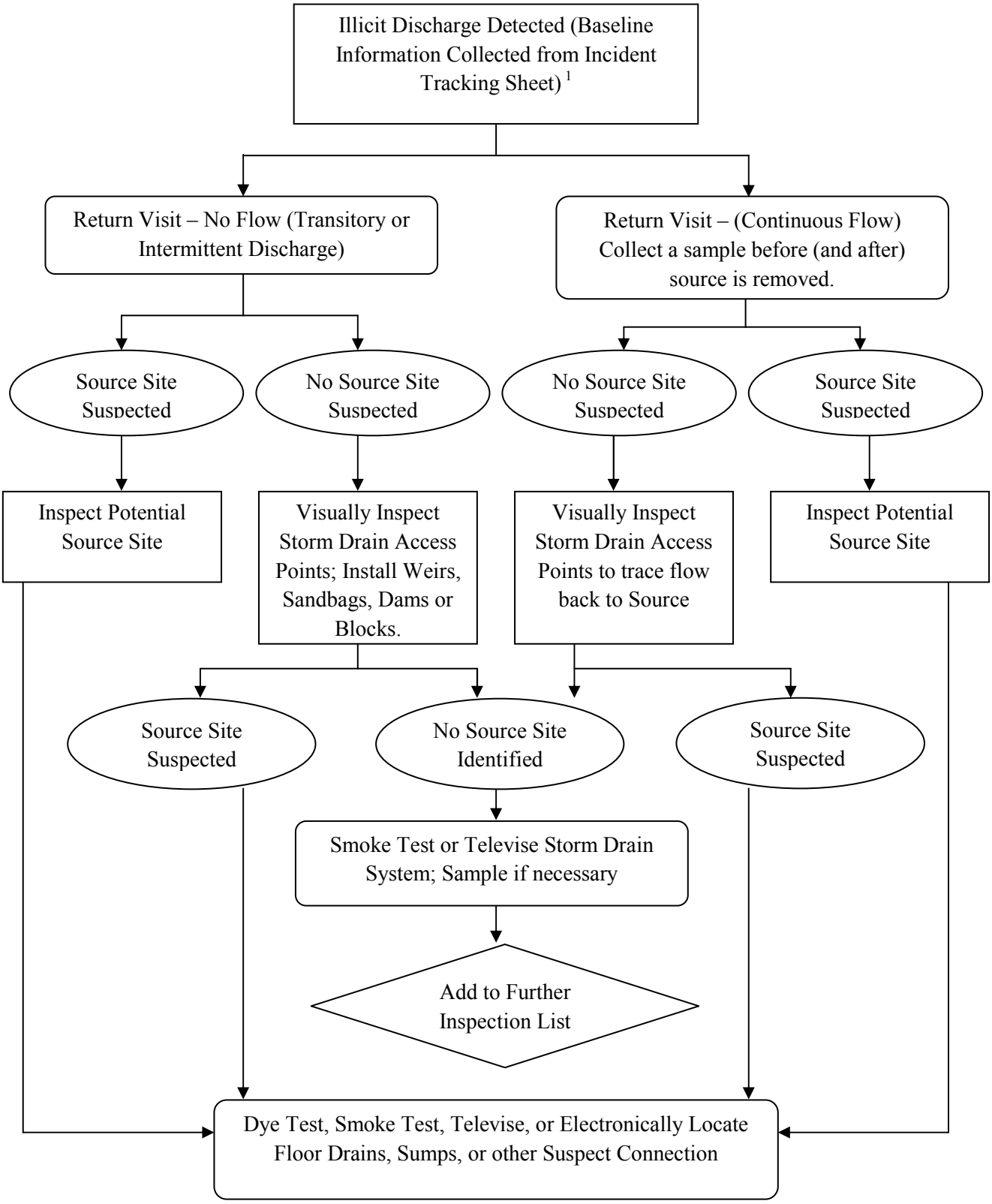
Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection
3. SOP 3: Catch Basin Inspection
4. SOP 13: Using Field Test Kits For Outfall Screening
5. SOP 15: Private Drainage Connections

Table SOP 10-1

Notification and Removal Procedures for Illicit Discharges into the Municipal Separate Storm Sewer System

Financially Responsible	Source Identified	Enforcement Authority	Procedure to Follow
Private Property Owner	One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Private Property Owner	Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Private Property Owner	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	• Notify Plumbing Inspector or ordinance enforcement authority
Municipal	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Exempt 3rd Party	Any	USEPA	• Notify exempt third party and USEPA of illicit discharge


Illicit Discharge Detected (Baseline Information Collected from Incident Tracking Sheet) [1]
Return Visit – No Flow (Transitory or Intermittent Discharge)
Return Visit – (Continuous Flow) Collect a sample before (and after) source is removed.
Source Site Suspected
No Source Site Suspected
No Source Site Suspected
Source Site Suspected
Inspect Potential Source Site
Visually Inspect Storm Drain Access Points; Install Weirs, Sandbags, Dams or Blocks.
Visually Inspect Storm Drain Access Points to trace flow back to Source
Inspect Potential Source Site
Source Site Suspected
No Source Site Identified
Source Site Suspected
Smoke Test or Televise Storm Drain System; Sample if necessary
Add to Further Inspection List
Dye Test, Smoke Test, Televise, or Electronically Locate Floor Drains, Sumps, or other Suspect Connection

[1] – *Guidelines and Standard Operating Procedures: Illicit Discharge Detection and Elimination and Pollution Prevention/Good Housekeeping for Stormwater Phase II Communities in New Hampshire,* New Hampshire Estuary Project, 2006, p. 25, Figure 2-1.

Illicit Discharge Incident Tracking Sheet

Incident ID:				
Responder Information (for Citizen-Reported issues)				
Call Taken By:		Call Date:		
Call Time:		Precipitation (inches) in past 24-48 hours:		
Observer Information				
Date and Time of Observation:		Observed During Regular Maintenance or Inspections? ☐ Yes ☐ No		
Caller Contact Information (optional) or Municipal Employee Information:				
Observation Location: (complete one or more below)				
Latitude and Longitude:				
Stream Address or Outfall #:				
Closest Street Address:				
Nearby Landmark:				
Primary Location Description		**Secondary Location Description:**		
☐Stream Corridor (In or adjacent to stream)		☐Outfall	☐In-stream Flow	☐Along Banks
☐Upland Area (Land not adjacent to stream)		☐Near Storm Drain	☐Near other water source (stormwater pond, wetland, ect.):	
Narrative description of location:				
Upland Problem Indicator Description				
☐Dumping	☐Oil/Solvents/Chemicals		☐Sewage	
☐Detergent, suds, etc.	☐Other:_____			
Stream Corridor Problem Indicator Description				
Odor	☐None	☐Sewage	☐Rancid/Sour	☐Petroleum (gas)
	☐Sulfide (rotten eggs); natural gas	☐Other: Describe in "Narrative" section		
Appearance	☐"Normal"	☐Oil Sheen	☐Cloudy	☐Foam
	☐Optical enhancers	☐ Discolored		
	☐Other: Describe in "Narrative" section			
Floatables	☐None	☐Sewage (toilet paper, etc)	☐Algae	☐Trash or debris
	☐Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Source (name, personal or vehicle description, license plate #, address, etc.):				

CMRSWC

EPA New England Bacterial Source Tracking Protocol
Draft – January 2012

Purpose

This document provides a common framework for EPA New England ("EPA-NE") staff to develop and implement bacterial source tracking sample events, and provides a recommended approach to watershed association, municipal, and State personnel. Adopted from Boston Water and Sewer Commission ("BWSC") (2004), Pitt (2004), and based upon fieldwork conducted and data collected by EPA-NE, the protocol relies primarily on visual observations and the use of field test kits and portable instrumentation during dry and wet weather to complete a screening-level investigation of stormwater outfall discharges or flows within the drainage system. When necessary, the addition of more conclusive chemical markers may be included. The protocol is applicable to most typical Municipal Separate Storm Sewer Systems ("MS4s") and smaller tributary streams. The smaller the upstream catchment area and/or more concentrated the flow, the greater the likelihood of identifying an upstream wastewater source.

Introduction

The protocol is structured into several phases of work that progress through investigation planning and design, laboratory coordination, sample collection, and data evaluation. The protocol involves the concurrent collection and analyses of water samples for surfactants, ammonia, total chlorine, and bacteria. When more precise confirmation regarding the presence or absence of human sanitary sewage is necessary, and laboratory capacity is available, the additional concurrent collection of samples for select Pharmaceutical and Personal Care Product ("PPCP") analysis is advised. When presented with a medium to large watershed or numerous stormwater outfalls, the recommended protocol is the screening of all outfalls using the surfactant, ammonia, total chlorine, and bacterial analyses, in addition to a thorough visual assessment. The resulting data and information should then be used to prioritize and sample a subset of outfalls for all parameters, including PPCP compounds and additional analyses as appropriate. Ideally, screening-level analyses can be conducted by state, municipal, or local watershed association personnel, and a prioritized sub-set of outfalls can be sampled through a commercial laboratory or by EPA-NE using more advanced confirmatory techniques.

Step I – Reconnaissance and Investigation Design

Each sample event should be designed to answer a specific problem statement and work to identify the source of contamination. Any relevant data or reports from State, municipal, or local watershed associations should be reviewed when selecting sample locations. Aerial photography, mapping services, or satellite imagery resources are available free to the public through the internet, and offer an ideal way to pre-select locations for either field verification or sampling.

Sample locations should be selected to segregate outfall sub-catchment areas or surface waters into meaningful sections. A common investigative approach would be the identification of a

specific reach of a surface water body that is known to be impaired for bacteria. Within this specific reach, stormwater outfalls and smaller tributary streams would be identified by desktop reconnaissance, municipal outfall mapping, and field investigation when necessary. Priority outfalls or areas to field verify the presence of outfalls should be selected based on a number of factors, including but not limited to the following: those areas with direct discharges to critical or impaired waters (e.g. water supplies, swimming beaches); areas served by common/twin-invert manholes or underdrains; areas with inadequate levels of sanitary sewer service, Sanitary Sewer Overflows ("SSOs") or the subject of numerous/chronic sanitary sewer customer complaints; formerly combined sewer areas that have been separated; culverted streams, and; outfalls in densely populated areas with older infrastructure. Pitt (2004) provides additional detailed guidance.

When investigating an area for the first time, the examination of outfalls in dry-weather is recommended to identify those with dry-weather flow, odor, and the presence of white or gray filamentous bacterial growth that is common (but not exclusively present) in outfalls contaminated with sanitary. For those outfalls with dry-weather flow and no obvious signs of contamination, one should never assume the discharge is uncontaminated. Sampling by EPA-NE staff has identified a number of outfalls with clear, odorless discharges that upon sampling and analyses were quite contaminated. Local physical and chemical conditions, in addition to the numerous causes of illicit discharges, create outfall discharges that can be quite variable in appearance. Outfalls with no dry-weather flow should be documented, and examined for staining or the presence of any obvious signs of past wastewater discharges downstream of the outfall.

As discussed in BWSC (2004), the protocol may be used to sample discreet portions of an MS4 sub-catchment area by collecting samples from selected junction manholes within the stormwater system. This protocol expands on the BWSC process and recommends the concurrent collection of bacteria, surfactant, ammonia, and chlorine samples at each location to better identify and prioritize contributing sources of illicit discharges, and the collection of PPCP compounds when more conclusive source identification is necessary.

Finally, as discussed further in Step IV, application of this sampling protocol in wet-weather is recommended for most outfalls, as wet-weather sampling data may indicate a number of illicit discharge situations that may not be identified in dry weather.

Step II – Laboratory Coordination

All sampling should be conducted in accordance with a Quality Assurance Project Plan ("QAPP"). A model QAPP is included as Attachment 1. While the QAPP details sample collection, preservation, and quality control requirements, detailed coordination with the appropriate laboratory staff will be necessary. Often sample events will need to be scheduled well in advance. In addition, the sampling team must be aware of the strict holding time requirements for bacterial samples – typically samples analysis must begin within 6 hours of sample collection. For sample analyses conducted by a commercial laboratory, appropriate coordination must occur to determine each facilities respective procedures and requirements.

The recommendations in this protocol are based on the use of a currently unpublished EPA-NE modification to *EPA Method 1694 – Pharmaceuticals and Personal Care Products in Water, Soil, Sediment, and Biosolids by HPLC/MS/MS*. Several commercial laboratories may offer Method 1694 capability. EPA-NE recommends those entities wishing to utilize a contract laboratory for PPCP analyses ensure that the laboratory will provide quantitative analyses for acetaminophen, caffeine, cotinine, carbamazepine, and 1,7-dimethylexanthine, at Reporting Limits similar to those used by EPA-NE (See Attachment 2). Currently, the EPA-NE laboratory has limited capacity for PPCP sampling, and any proposed EPA-NE PPCP sample events must be coordinated well in advance with the appropriate staff.

Step III – Sample Collection

Once a targeted set of outfalls has been selected, concurrent sampling and analyses for surfactants, ammonia, and total chlorine (which can all be done through the use of field kits), in addition to bacteria (via laboratory analysis) should be conducted. When numerous outfalls with dry-weather flow exist, sample locations should be prioritized according to the criteria mentioned above. In addition, field screening using only the field kits may occur during the field reconnaissance. However, it must be emphasized that the concurrent sampling and analyses of bacteria, surfactant, ammonia, and total chlorine parameters is the most efficient and cost-effective screening method.

When first observed, the physical attributes of each outfall or sampling location should be noted for construction materials, size, flow volume, odor, and all other characteristics listed on the data collection form (Attachment 3). In addition, GPS coordinates should be collected and a photograph of the sample location taken. Whenever possible, the sampling of storm drain outfalls should be conducted as close to the outfall opening as possible. Bacterial samples should be collected first, with care to not disturb sediment materials or collect surface debris/scum as best possible. A separate bottle is used to collect a single water sample from which aliquots will be analyzed for surfactants, ammonia, and total chlorine. A sample for PPCP analysis is recommended to be collected last, as the larger volume required and larger bottle size may cause some sediment disturbance in smaller outfalls or streams. If necessary, a second smaller, sterile and pre-cleaned sampling bottle may be used to collect the surface water which can then be poured into the larger PPCP bottle. Last, a properly calibrated temperature/specific conductance/salinity meter should be used to record all three parameters directly from the stream or outfall. When flow volume or depth is insufficient to immerse the meter probe, a clean sample bottle may be utilized to collect a sufficient volume of water to immerse the probe. In such instances, meter readings should be taken immediately.

As soon as reasonably possible, sample aliquots from the field kit bottle should be analyzed. When concurrent analyses are not possible, ammonia and chlorine samples should be processed first, followed by surfactant analysis, according to each respective Standard Operating Procedure as appropriate based on the particular brand and type of field test kit being used. All waste from the field test kits should be retained and disposed of according to manufacture instructions. Where waste disposal issues would otherwise limit the use of field kits, EPA-NE recommends

that, at a minimum, ammonia test strips with a Reporting Limit below 0.5 mg/L be utilized. Such test strips typically are inexpensive and have no liquid reagents associated with their use. Results should be recorded, samples placed in a cooler on ice, and staff should proceed to the next sample location.

Upon completion of sampling and return to the laboratory, all samples will be turned over to the appropriate sample custodian(s) and accompanied by an appropriate Chain-of-Custody ("COC") form.

Step IV – Data Evaluation

Bacterial results should be compared to the applicable water quality standards. Surfactant and ammonia concentrations should be compared to the thresholds listed in Table 1. Evaluation of the data should include a review for potential positive results due to sources other than human wastewater, and for false negative results due to chemical action or interferences. In the EPA-NE region, field sampling has indicated that the biological breakdown of organic material in historically filled tidal wetlands may cause elevated ammonia readings, as can the discharge from many landfills. In addition, salinity levels greater than 1 part per thousand may cause elevated surfactant readings, the presence of oil may likewise indicate elevated levels, and fine suspended particulate matter may cause inconclusive surfactant readings (for example, the indicator ampule may turn green instead of a shade of blue). Finally, elevated chlorine from leaking drinking water infrastructure or contained in the illicit wastewater discharge may inhibit bacterial growth and cause very low bacterial concentrations. Any detection of total chlorine above the instrument Reporting Limit should be noted.

Table 1 – Freshwater Water Quality Criteria, Threshold Levels, and Example Instrumentation [1]

Analyte/ Indicator	**Threshold Levels/ Single Sample[3]**	**Instrumentation**
E. coli [2]	235 cfu/100ml	Laboratory via approved method
Enterococci [2]	61 cfu/100ml	Laboratory via approved method
Surfactants (as MBAS)	$\geq$ 0.25 mg/l	MBAS Test Kit (e.g. CHEMetrics K-9400)
Ammonia (NH_3)	$\geq$ 0 .5 mg/l	Ammonia Test Strips (e.g. Hach brand)
Chlorine	> Reporting Limit	Field Meter (e.g. Hach Pocket Colorimeter II)
Temperature	See Respective State Regulations	Temperature/Conductivity/Salinity Meter (e.g. YSI Model 30)

[1] The mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. EPA

[2] 314 CMR 4.00 MA - Surface Water Quality Standards - Class B Waters.

[3] Levels that may be indicative of potential wastewater or washwater contamination

Once dry-weather data has been examined and compared to the appropriate threshold values, outfalls or more discreet reaches of surface water can be selected for sampling or further investigation. Wet-weather sampling is also recommended for all outfalls, in particular for those that did not have flow in dry weather or those with dry-weather flow that passed screening thresholds. Wet-weather sampling will identify a number of situations that would otherwise pass unnoticed in dry weather. These wet-weather situations include, but are not limited to the following: elevated groundwater that can now cause an exchange of wastewater between cracked or broken sanitary sewers, failed septic systems, underdrains, and storm drains; increased sewer volume that can exfiltrate through cracks in the sanitary piping; increased sewer volume that can enter the storm drain system in common manholes or directly-piped connections to storm drains; areas subject to capacity-related SSO discharges, and; illicit connections that are not carried through the storm drain system in dry-weather.

Step V – Costs

Use of field test kits and field instruments for a majority of the analytical parameters allows for a significantly reduced analytical cost. Estimated instrument costs and pro-rated costs per 100 samples are included in Table 2. The cost per 100 samples metric allows averaged costs to account for reagent refills that are typically less expensive as they do not include the instrument cost, and to average out the initial capital cost for an instrument such as a temperature/ conductivity/salinity meter. For such capital costs as the meters, the cost over time will continue to decrease.

Table 2 – Estimated Field Screening Analytical Costs [1]

Analyte/ Indicator	Instrument or Meter [2]	Instrument or Meter Cost/No. of Samples	Cost per Sample (Based on 100 Samples) [3]
Surfactants (as MBAS)	Chemetrics K-9400	$77.35/20 samples ($58.08/20 sample refill)	$3.09
Ammonia (NH_3)	Hach brand 0 – 6 mg/l	$18.59/25 samples	$0.74
Total Chlorine	Hach Pocket Colorimeter II	$389/100 samples ($21.89 per 100 sample refill)	$3.89
Temperature/ Conductivity/ Salinity	YSI	$490 (meter and cable probe)	$4.90

1 Estimated costs as of February 2011

2 The mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. EPA

3 One-time meter costs and/or refill kits will reduce sample costs over time

From Table 2, the field analytical cost is approximately $13 per outfall. Typical bacterial analyses costs can vary depending on the analyte, method, and total number of samples to be

performed by the laboratory. These bacterial analyses costs can range from $20 to $60. Therefore, the analytical cost for a single outfall, based on the cost per 100 samples, ranges from $33 to $73. As indicated above, these costs will decrease slightly over time due to one-time capitals costs for the chlorine and temperature/conductivity/salinity meters.

Step VI – Follow-Up

Once all laboratory data has been reviewed and determined final in accordance with appropriate quality assurance controls, results should be reviewed with appropriate stakeholders to determine next steps. Those outfalls or surface water segments that fail to meet the appropriate water quality standard, and meet or exceed the surfactant and ammonia threshold values, in the absence of potential interferences mentioned in Step IV, indicate a high likelihood for the presence of illicit connections upstream in the drainage system or surface water. Whereas illicit discharges are quite variable in nature, the exceedance of the applicable water quality standard and only the ammonia or surfactant threshold value may well indicate the presence of an illicit connection. When available, the concurrent collection and analyses of PPCP data can greatly assist in confirming the presence of human wastewater. However, such data will not be available in all instances, and the collective data set and information regarding the physical characteristics of each sub-catchment or surface water reach should be used to prioritize outfalls for further investigation. As warranted, data may be released to the appropriate stakeholders, and should be accompanied by an explanation of preliminary findings. Release of EPA data should be fully discussed with the case team or other appropriate EPA staff.

References Cited

Boston Water & Sewer Commission, 2004, *A systematic Methodology for the Identification and Remediation of Illegal Connections.* 2003 Stormwater Management Report, chap. 2.1.

Pitt, R. 2004 *Methods for Detection of Inappropriate Discharge to Storm Drain Systems. Internal Project Files*. Tuscaloosa, AL, *in* The Center for Watershed Protection and Pitt, R., *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*: Cooperative Agreement X82907801-0, U.S. Environmental Protection Agency, variously paged. Available at: http://www.cwp.org.

Instrumentation Cited (Manufacturer URLs)

MBAS Test Kit - CHEMetrics K-9400: http://www.chemetrics.com/Products/Deterg.htm

Portable Colorimeter – Hach Pocket Colorimeter II: http://www.hach.com/

Ammonia (Nitrogen) Test Strips: http://www.hach.com/

Portable Temperature/Conductivity/Salinity Meter: YSI Model 30: http://www.ysi.com/productsdetail.php?30-28

Disclaimer: The mention of trade names or commercial products in this protocol does not constitute endorsement or recommendation for use by the U.S. EPA.

Stormwater Monitoring Quality Assurance Project Plan
2012-2017

RFA #

Sampling Plan Acceptance

EPA OES Enforcement and Project Manager/Coordinator **Signature:**	**Date:**
EPA OEME Project Managers/Coordinator **Signature:**	**Date:**
EPA OEME QA Officer **Signature:**	**Date:**
EPA Chemistry Team Lead **Signature:**	**Date:**

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1.0 Background

U.S. EPA Administrative Order 5360.1 requires that "all projects involving environmental monitoring performed by or for the U.S. EPA shall not be undertaken without an adequate Quality Assurance Project Plan (QAPP)." The purpose of this document is to describe the process used to develop, select, manage, and finalize stormwater monitoring projects. In describing this process, quality assurance goals and methods will be established, thus ensuring that the overall program and each monitoring project will meet or exceed EPA requirements for quality assurance.

The objective of these projects will be to collect data that is usable by EPA OES enforcement staff for enforcement actions and information requests. The primary focus of this project will be on urban water stormwater outfalls in the New England Region watersheds.

2.0 Sampling overview

Monitoring will be conducted on pre-scheduled days with the Laboratory. Samples will be retrieved from surface water, in stream or outfalls at suspected hotspots or areas that need further delineation. Sample sites will be located using GPS, with an accuracy goal of $\pm$ 1 meter and PDOP less than 6. Less accurate GPS reading or coordinates from maps will be accepted when site or other conditions do not allow $\pm$ 1 meter accuracy.

The primary focus of this sampling will be used to identify illegal discharges.
Results from the sampling will be used by EPA enforcement staff for enforcement purposes. For this project, sampling will be conducted according to EPA's Ambient Water Sampling SOP (Table 3). Volunteers and watershed association staff may assist in sampling. All procedures will be followed that are specified in Table 3. Parameter to be sampled will be predetermined by enforcement (OES) and OEME staff, based on data needs.

A. Locations

Site locations will be determined from field or desktop reconnaissance by project staff. Sample analyses will be predetermined based on conditions known about the sampling location prior to sampling. These may include data from previous sampling or from data collected from Mass DEP or local watershed associations. Any of the parameters listed in table 2 may be analyzed.

B. Analytical Methods and Reporting limits

Sample analyses will be conducted by EPA Laboratories.

This effort will test and compare the most appropriate analytical methods including, but not limited to; laboratory analysis, test kits and field analysis to determine the most effective and cost-efficient outfall and in-stream sampling approach.
Multiple and repeated testing will occur at each location to compare different method for identifying sewage contamination.

PPCPs, E.coli and enterococcus will be analyzed by EPA's Laboratory. Surfactants, ammonia, total chlorine will be analyzed with field test kits. Potential additional laboratory analyses include nitrogen (nitrate/nitrite), TSS, BOD, surfactants, ammonia and TPH. The Laboratory used

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for each sampling event will be determined prior to sampling by the OEME Project Manager based on required analyses Laboratory availability and contract funds available.

Where available, a known concentration sample will be used to evaluate the performance of each test method. The known concentration sample will be processed in the field and Laboratory as a routine sample. The analyst or field technician will not know the concentration of the sample prior to analyzing and reporting the sample result. Sampling for PPCP testing will be done using extreme care not to contaminate the sample. No caffeine products should be consumed prior to sampling.

Table 1: Parameter specifications

Parameter (lab - equipment)	Preservation	Holding time
PH	None	Immediate
Temperature	None	Immediate
Sp Cond	None	Immediate
DO	None	Immediate
Total Phosphorus (EPA)	H_2SO_4 (pH <2) + Ice	28 days
TSS (EPA)	Ice	7 days
TSS (Alpha)	Ice	7 days
BOD (Alpha)	Ice	48 hours
Surfactants (Alpha)	Ice	48 hours
Surfactants (field kit – Chemetrics)	None	Immediate
Ammonia (alpha)	H_2SO_4 (pH <2) + Ice	28 days
Ammonia (test strips)	None	Immediate
TPH Petroleum ID (alpha)	Ice	7 Days to extraction 40 days after extraction
E. Coli (EPA)	Ice	6 hrs to lab
Enterococcus (EPA)	Ice	6 hrs to lab
PPCP	Ice (acidified in Lab)	7 day to extraction 40 days after extraction
Chlorine (Field kit – Hach)	None	Immediate

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Table 2: Analytical References and Quality Control Goals

		Water Quality Criteria or Guidelines	Quality Assurance Goals		
Parameter (lab- equipment)	**Reporting Limits**	**(MA or EPA)**	**Precision**	**Accuracy**	**Completeness**
PH	4 to 10 units	6.5 - 8.3	0.02 unit	± 0.3 units	90%
Temperature	0 to +40°C	28.3°C	0.1 °C	± 0.15°C	90%
Sp Cond	0 to 100 mS/cm	NA	5 uS/cm	±10% cal std (µS/cm)	90%
DO	0.5mg/l to Sat	≥5 mg/l , ≥60% saturation	0.02mg/l	± .5 mg/l	90%
Total Phosphorus (EPA)	5.0 ug/l	NA	Field dup 30% RPD	MS 70-130%	90%
TSS (EPA)	5mg/L	NA	Field dup 30% RPD	See SOP	
TSS (Alpha)	5 mg/L	NA	Field dup 30% RPD	See SOP	90%
BOD (Alpha)	2 mg/L	NA	Field dup 30% RPD	See SOP	90%
Surfactants (field kit – Chemetrics)	0.25 mg/L[1]	0.25 mg/L	Field dup 30% RPD	TBD	90%
Ammonia (test strips)	0.25 mg/L[1]	1.0 mg/L	Field dup 30% RPD	TBD	90%
TPH Petroleum ID (alpha)	Variable	NA	Field dup 30% RPD	See SOP	
E. Coli (EPA)	4 col./ 100 ml	<=126 col./100 ml* <= 235 col./100 ml	±100 col/100ml or 30% RPD	N/A	90%
Enterococcus (EPA)	1 col/100ml	<=33 col./100 ml* <= 61 col./100 ml	±100 col/100ml or 30% RPD	See SOP	90%
PPCP	TBD	NA	Field dup 50% RPD	TBD	90%
Chlorine (Field kit – Hach)	0.02 mg/l	NA	Field dup 30% RPD	TBD	90%

Note
*Geometric mean Criteria
TBD = To be determined, Field methods and some colorimeter methods do not have accuracy criteria determined.
[1] Needs field verification to confirm

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Table 3: Field and Laboratory References

Parameter	Analytical Method Reference	SOP reference
	Field References- 5/2005	
pH		
Conductivity		
Temperature		
dissolved oxygen	n/a	ECASOP-YSISondes9
Ambient water samples	n/a	ECASop-Ambient Water Sampling2
Chain of custody of samples	n/a	EIASOP-CHAINOFCUST
Sample login, tracking, disposition	n/a	EIASOP-ADMLOG14
	Lab. References- 5/ 2005	
Total Phosphorus (EPA)	EPA 365.3	EIASOP-INGTP8
TSS (EPA)	EPA 160.2	EIASOP-INGTSS-TDS-VRES5
TSS (Alpha)	EPA 160.2,SM2540D	SOP/07-29
BOD (Alpha)	EPA 405.1,SM5210B	SOP/07-13
Surfactants (field kit – Chemetrics)	Chemetrics	Draft
Ammonia (test strips)	Hach	Draft
TPH Petroleum ID (alpha)	8015B (M)	0-017
E. Coli (EPA)	SM9230	ECASOP- TC/EC Colilert2
Enterococcus (EPA)	SM9230	ECASOP-Enterolert1
PPCP	EPA 1694	TBD
Chlorine (Field kit – Hach)	Hach	TBD

*Specific conductance is the only parameter identified as non critical

Bottle list

Table 4: Bottle Sampling List

Parameter (lab - equipment)	Bottle	Preservation
Primary analyses		
E. Coli (EPA)	(2) 120ml or 250ml sterile	Ice
Enterococcus (EPA)		Ice
PPCP	1 Liter Amber	Ice (acidified in Lab)
Optional analyses		
Chlorine (Alpha)	500 ml	Ice
Total Phosphorus (EPA)	125 ml	H_2SO_4 (pH <2) + Ice
TSS (EPA)	1 liter	Ice
TSS (Alpha)	1 liter	Ice
BOD (Alpha)	1 Liter	Ice
TPH Petroleum ID (alpha)	2 -1 Liter Amber Glass tephlon lined	Ice
E. Coli (Alpha)	120 ml sterile	Ice
Enterococcus (Alpha)	120 ml sterile	Ice

DRAFT

C. Quality Control

Calibration:	EPA will calibrate its sondes according to the EPA sonde calibration SOP.
Field duplicate:	One duplicate sample will be collected per sampling event or approximately for every ten samples.
Trip Blank:	OEME Chemist will run appropriate QA samples for PPCP's. One blank sample will be collected for approximately every ten bacteria samples. Reported data that is less than 5 times the trip (field) blank concentration will be flagged.
QC Criteria:	Are specified in table 2, data not meeting this criteria will be reviewed by the Project Manager. Data that does not meet laboratory QA/QC criteria will be flagged by the laboratory.

D. Chain of Custody

Chain of custody procedures will follow the OEME/Investigations Office SOP (Table 3)

3.0 Data Review

EPA Microbiology data will be reviewed by the Biology QAO. Alpha generated microbiology samples will be reviewed by the OEME Project Manager. All field data and draft data reports will be reviewed by the OEME Project manager. Laboratory generated data (from Alpha and EPA) will be reviewed by the Chemistry Team Leader.

4.0 Data reports

Data reports will be reviewed by the Project Coordinator and the OEME Project Manager before a final report is release to the Enforcement Coordinator. Draft reports may be released without a complete review.

DRAFT

5.0 Attachments

1) Standard Operating Procedure Enterococcus (SM9230B), Multiple Tube Technique. SOP/07-01 *Alpha Analytical, Inc. May 28, 2005*

2) Standard Operating Procedure E. Coli (SM9213D). SOP/07-41 *Alpha Analytical, Inc. May 28, 2005*

3) Standard Operating Procedure MBAS, Ionic Surfactants. Draft SOP *EPA Laboratory. January 28, 2010*

4) Standard Operating Procedure Nitrogen Ammonia. Draft SOP *EPA Laboratory. February 10, 2011*

5) Standard Operating Procedure Total Chlorine. Draft SOP *EPA Laboratory. February 12, 2010*

6) Standard Operating Procedure TSS/ TVSS (SM2540 D, EPA 160.2). SOP/07-29 *Alpha Analytical, Inc. September 29, 2007*

7) Standard Operating Procedure BOD-5day, SBOD-5day, and cBOD-5day (SM 5210B, and EPA 405.1). SOP/07-13 *Alpha Analytical, Inc. September 29, 2007*

8) Standard Operating Procedure TPH 8015D – Modified 0-017 (EPA 8015D Modified) *Alpha Analytical, Inc. March 04, 2008*

9) Standard Operating Procedure determination of Trace Elements in Water and Wastes by Inductively Coupled Plasma- Mass Spectrometry (200.8). SOP/06-11 Alpha Analytical, Inc. July 13, 200

10) Standard Operating Procedure Inductively Coupled Plasma – Mass Spectrometry (6020). SOP/06-10 Alpha Analytical, Inc. October 25, 2007

DRAFT

EPA United States Environmental Protection Agency

Target Compounds, Uses, and Reporting Limits

Target Compound	Major Use	RL (ng/L)	Daily Dose (ng)
Caffeine	Natural Stimulant	5.0	200,000,000
1,7-DMX	Metabolite of caffeine	2.5	N/A
Acetaminophen	Pain Reliever	2.5	650,000,000
Carbamazepine	Anti- depressant / bi-polar Anti-convulsant (epilepsy)	0.5	100,000,000
Primidone	Anti- epilepsy drug (AED)	5.0	100,000,000
Atenolol	Beta Blocker High Blood Pressure	2.5	50,000,000
Cotinine	Metabolite of Nicotine	0.5	3,500-7,200 (ng/mL)
Urobilin	By-product of hemoglobin breakdown (mammals)	5.0	1,300,000 ng/g in feces
Azithromycin	Antibiotic	1.6	200,000,000

Attachment 3

STORMWATER MONITORING

Field Collection Requirements (To be recorded at each site)

Sample-
Site Name _____

Time collected_____

Date collected_____

Inspection-
****Take picture at site****
Outfall diameter_____('na' if open stream)

Flow estimate_____('na' if open stream)

Odor_____

Color_____

Turbidity_____

Floatables_____

Other observations_____

_____

YSI Meter (calibrate in lab)-
Salinity_____

Temp_____

Conductivity (give both #'s)

_____

Location information-
Short description of where sample was collected at site_____

_____

_____

GPS_____

_____

Field Kits listed in the order they should be conducted in, include any applicable notes-

NH3 strip_____

Cl2 kit_____
Hach meter – (3 min wait)

Surfactant_____
Chemetrics K-9400 Blue box/detergent test kit

Additional Notes:

(Note any changes in weather conditions)_____

_____

_____

_____

_____

Attachment 3

STORMWATER MONITORING (PAGE 2)

Field Equipment List

Waste Containers (2 total – clearly labeled):

1 liter amber plastic for surfactants/detergents kit waste
1 liter amber plastic for Cl2 kit waste

Sample Bottles (3 total for each sample location)-
120ml sterile – E.coli/entero
1 Liter amber glass: PPCP, *EPA* (Peter Philbrook)
120ml-250ml plastic – Field Kit Bottle – to be used on site for kits listed above

***Fill out chain of custody

In Carboy Container
☐Log book
☐COC forms
☐Extra sample bottles
☐Colored tape
☐Sharpies
☐Write-On-Rain Pens
☐Paper towels
☐GPS
☐Sampling plan & GPS locations
☐Regular length Powder Free Gloves
☐Squirt bottle of DI Water
☐Coolers with Ice
☐Waders/Boots
☐YSI multi parameter Meter

APPENDIX J

IDDE Employee Training Records

TRAINING AGENDA

IDDE Training Plan & Sign-In Sheet

December 6, 2018
9:00 AM – 12:00 PM
Cambridge DPW

Training Plan:

1. Meet at DPW to review and practice field test kits:
    - Ammonia
    - Surfactants
    - Chlorine

2. Meet in the field to review manhole inspection and sampling procedures

Sign-in Sheet:

Name	Signature	Organization
Lucica Hiller	Lucica Hiller	Kleinfelder
Andrew Goldberg	Andrew	Kleinfelder
Jen Zappo	Jen Zappo	Stantec
Zack Halstead	Zack Halstead	Stantec
Wendy Robins	Wendy Robin	DPW
Yilkal Bekele	YB	DPW
Katherine Watkins	Katherine	DPW
Catherine DaleyWoodbury	C Daley Woodbury	DPW

TRAINING AGENDA

Name	Signature	Organization
Jim Wilcox	Jay Wilcox	Cambridge DPW
MIKE ABCUNAS	Michael Abcunas	" "

SIGN-IN SHEET

IDDE Program Plan Review

February 5, 2019
10:00 AM – 12:00 PM
Cambridge DPW

Agenda:

1. Review Draft IDDE Program Plan
2. IDDE Training Follow-up
3. Stormwater Management Plan
4. SWPPPs
5. Next Steps/Schedule

Sign-in Sheet:

Name	Signature	Organization
Yikal Bekele		public works
Jen Zappo		Stantec
Andrew Goldberg		Kleinfelder
Wendy Robbins		DPW
Siddharth Saklecha		DPW
Joseph Sameroski		DPW
Jim Wilcox		DPW

TRAINING AGENDA

IDDE Training Plan & Sign-In Sheet

Date: January 30, 2020
Time: 12:00 PM – 3:00 PM
Location: Cambridge DPW

Training Plan:

1. Meet at DPW to review IDDE Plan and demonstrate field sampling test procedures:
    - Ammonia
    - Surfactants
    - Chlorine
    - Conductivity, Salinity, Temperature

2. Meet in the field to review manhole inspection and sampling procedures

Sign-in Sheet:

Name	Signature	Organization
Catherine Daly Woodbury	C Daly Woodbury	DPW
Zack Halsted	Zack Halsted	Stantec
Yiltal Bekele	Y Bekele	DPW
Lisa Martinez	Lisa Martinez	DPW
Wendy Robinson	Wendy Robinson	DPW
Brian Rose	Brian Rose	DPW
Daniel Merchut	Daniel Merchut	DPW

TRAINING AGENDA

Name	Signature	Organization
Jen Zoppo	Jennifer Zoppo	Stantec
David Wright		Cambridge DPW

TRAINING AGENDA

IDDE Training Plan & Sign-In Sheet

Date: May 14, 2021

Time: 9:00 AM – 12:00 PM

Location: Cambridge DPW

Training Plan:

1. Meet at DPW to review IDDE Plan and demonstrate field sampling test procedures:
   - Ammonia
   - Surfactants
   - Chlorine
   - Conductivity, Salinity, Temperature

2. Meet in the field to review manhole inspection and sampling procedures

Sign-in Sheet:

Name	Signature	Organization
Yitkal Bekele		DPW
Elizabeth Ka		SDE
Emily Bonaccorso		Stantec
Caroline Akerley		Stantec
Herb Stern		DPW
David Wright		DPW
Yaser Samra		DPW
Emily Paulsen		DPW

TRAINING AGENDA

Brian	Mclaw	
T.J.	Shea	T.J Shea
James	Wilcox	
Catherine	Woodbury	C Woodbury
Daniel Nadolny		
Debbie Cheng		Kleinfelder

TRAINING AGENDA

IDDE Training Plan & Sign-In Sheet

Date: May 3, 2022

Time: 9:00 AM – 12:00 PM

Location: Cambridge DPW

Training Plan:

1. Review IDDE Plan
2. Review Catchment D31 Sparks Street Investigation/Findings
3. Demonstrate field sampling test procedures:
    - Ammonia
    - Surfactants
    - Chlorine
    - Conductivity, Salinity, Temperature, pH

Sign-in Sheet:

Name	Signature	Organization
Emily Paulsen	Emily Paulsen	Cambridge DPW
Yaser Samerraie		Cambridge DPW
Yilkal Bekele	YBekele	Cambridge DPW
C Dalywoodberry	C Dalywoodberry	Cambridge DPW
Penny Antonoglou		Cambridge DPW
Robert Lee		Camb. DPW
Lisa Martinez	Lisa Martinez	Camb. DPW

TRAINING AGENDA

Name	Signature	Organization
Wendy Robinson	Wendy Robinson	Cambridge DPW
Brian Rowe	Brian Rowe	Cambridge DPW
Daniel Merchant	Daniel Merchant	Cambridge DPW

TRAINING AGENDA

IDDE Training Plan & Sign-In Sheet

Date: May 3, 2023

Time: 9:00 AM – 12:00 PM

Location: Cambridge DPW

Training Plan:

1. Cambridge MS4 System Overview
2. MS4 Permit Overview
3. Illicit Discharge Detection and Elimination:
    - Illicit Discharges
    - SSOs
    - Dry Weather Outfall Screening & Sampling
    - Catchment Investigations
4. Demonstrate field sampling test procedures:
    - Ammonia
    - Surfactants
    - Chlorine
    - Conductivity, Salinity, Temperature, pH

Sign-in Sheet:

Name	Signature	Organization/Department
Melissa Miguel	Mmiguel	Cambridge DPW
Cambria Ung	Cambria Ung	DPW
Lisa Martin	Lisa Martin	DPW
Yilkal Bekele	YBekele	DPW

TRAINING AGENDA

Name	Signature	Organization/Department
Yaser Samemia		DPW
David Wright		DPW
Catherine Woodbury		DPW
Wendy Robinson		DPW
Peter Vargas		Kleinfelder
Garrett Bergey		SDE
Robert Gulick		CDPW
Elizabeth Olsen		SDE
Dunny		DPW
Jen Zoppo		Stantec

IDDE TRAINING

Sign-In Sheet

Remote – Melissa, Catherine, Bruno, Dominic

Date: April 9, 2024

Location: DPW

Name	Signature	Organization/Department
Dan Valle	Dan Valle	DPW Engineering
Jen Letourneau		DPW Engineering
Lenny Russell		DPW/ENGINEERING
Jerry Friedman		DPW/Engineering
Brian McLane	DPW	DPW/ Streets
Emily Paulsen	Emily Paulsen	DPW Engineering
Wendy Robinson	Wendy Robinson	DPW Streets Sewers
Ted Bilger		DPW Engineers
DAVID WRIGHT		DPW ENGINEERING
LOUIS MATTHEW		DPW ENG.
Lena Frappier		DPW Eng
PAUL ALMEIDA		DPW / Street & Sewer
KARA FALISE		ENGR
Yitkal Bekele		DPW/Engineering

IDDE TRAINING

Name	Signature	Organization/Department
VANE DEMOULAS		DPW, ENGINEERING
Diane Stokes		DPW Engineering
Kevin Bertsch		DPW ENGINEERING
Jim Wilcox		DPW Engineering

TRAINING AGENDA

IDDE Training Plan & Sign-In Sheet

Date: May 13, 2024

Location: Cambridge DPW

Sign-in Sheet:

Name	Signature	Organization/Department
KMFalise		DPW
Yaser Samereei		DPW
Wendy Robinson		DPW
Jordan Thorpe		DPW
Robert Cosse		STREETS & SEWER
Jose Mostanzo		streets maint
Derrick NASH		streets maint
Dennis Nickerson		Streets
Steve Travers		Streets
Angelo Graziano		Streets
Paul Giesta		STREETS
DUKEVIC Admiral		Sewer
Nicole L		streets
Kate Leton		streets
Lisa Martine, Jessa M		Sewer
Danny Merchant		Sewer

KEN BRACERON

T.V Shea

IDDE TRAINING

IDDE Training Sign-In Sheet

Date: June 6, 2025

Time: 9:00am

Location: Cambridge DPW

Name	Signature	Department/Division
LUCICA HILLER	Lucica Hiller	DPW/ENGINEERING
John Grend	JGrend	DPW/ Engineering
Kaitlyn Drummey	Kaitlyn Drummey	DPW/ Engineering
Cynthia Kaleebu		DPW Engineering
Andrew DiFiore	Andrew DiFiore	DPW Engineering
CAROLYN ROSSMAN		DPW Engineering
Kevin Marlowe		DPW Engineering
KARA FALISE		DPW
Yilkal Bekele	YBekele	DPW
Michael Abang	Michael Abang	DPW
Cambria Ung	Cambria Ung	DPW/Engineering

IDDE Training

Date: April 29, 2026

Time: 11:00am – 12:30pm

Location: Virtual NEWEA Webinar

The following DPW employees attended the NEWEA 2026 IDDE webinar, which covered information consistent with the requirements for MS4 annual training:

Name	Department/Division
Cambria Ung	DPW Engineering
Kara Falise	DPW Engineering
Emily Boyle	DPW Engineering
David Wright	DPW Engineering
Zach Regan	DPW Engineering

NEWEA 2026 WEBINAR SERIES

Where's the Poop? Reviewing Methods and Real-World Case Studies to Close Complex IDDE Catchment Investigations

As we near the end of the Massachusetts MS4 permit schedule for Illicit Discharge Detection and Elimination (IDDE) catchment investigations, many communities have found and resolved the straightforward sources of contamination, and are left with increasingly difficult problem areas, or anomalies. What methodologies do we need to use to close out these anomalies with unresolved contamination? **Join NEWEA's Stormwater Committee for an in-depth webinar on April 29th to hear speakers highlight success stories of different methodologies using real-life case studies from New England IDDE Programs.** These methods include standard top-down catchment investigations, laboratory analyses (fecal indicator bacteria and surfactants), advanced DNA techniques (Total and Human Bacteroides), Sewer Dye Testing, and CCTV. The webinar will also cover information consistent with the requirements for municipal annual IDDE training. Understanding when to use each tool in the IDDE tool belt can help municipalities maximize their resources for, and results of, their IDDE programs.

Meet the Speakers

Jen Zoppo

Jen Zoppo is a Senior Associate at Stantec with 17 years' experience working on IDDE programs in New England.

Julia Vient

Julia Vient is a Civil Engineer at Stantec with 4 years experience working on stormwater design, MS4, and IDDE projects in New England.

Jillian Henrichon

Jillian Henrichon is a Director of Field Operations at SDE with 5 years of field and management experience of IDDE projects throughout New England.

Colin Brown

Colin Brown is a Director of Field Operations at SDE with 4 years of field and management experience of IDDE projects throughout New England.

Wednesday April 29, 2026
11:00 AM - 12:30 PM

REGISTER ONLINE: https://2026-spring-stormwater-webinar.events.newea.org/

COST:
NEWEA Members: $35
Non members: $45

QUESTIONS: Contact NEWEA at mail@newea.org

1.5 Training Contact Hours (TCHs)/Professional Development Hours (PDHs) are pending approval.

MODERATORS:
Natalie Pommersheim (Apex Companies), Chair, NEWEA Stormwater Committee
Maria Rose (Town of Brookline), Vice Chair, NEWEA Stormwater Committee

NEWEA
WORKING FOR WATER QUALITY

APPENDIX K

Safety Data Sheets (SDS)

1. Surfactants:
    -- SDS No. R9402: CHEMetrics K-9400 Double-Tipped Ampoules
    -- SDS No. R1001: CHEMetrics K-9400 CHEMets Ampoules
    -- SDS No. R1501: CHEMets® & VACUettes® Refills and Vacu-vials® Ampoules

2. Ammonia:
    -- SDS No. M00127: Ammonia Salicylate Reagent
    -- SDS No. M00128: Ammonia Cyanurate
    -- SDS No. R9402: Double-Tipped Ampoules for Detergents CHEMets® Kit and Refill and for Detergents Instrumental Test

3. Total Chlorine: SDS No. M00110 DPD Total Chlorine Reagent

4. Dissolved Oxygen: SDS No. M00537: Dissolved Oxygen Reagent, High Range

5. pH: SDS Oakton pH Buffer

6. Conductivity: SDS Oakton Conductivity Buffer

Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R9402

Version No.: 3.6

Product Name: Double-Tipped Ampoules for Detergents CHEMets® Kit and Refill and for Detergents Instrumental Test

Components of water analysis reagent sets: Refills R-9400, R-9423; and Kits I-2017, K-9400

Product Descriptions:

Double-Tipped Ampoules: Glass ampoules with dual tapered tips. Each double-tipped ampoule in K-9400 and R-9400 contains approximately 4 mL of liquid reagent. Each double-tipped ampoule in R-9423 contains approximately 9.5 mL of liquid reagent. Refills and test kits contain 20 double-tipped ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

CHEMets®, VACUettes®, Vacu-vials®, and Titrets® are registered trademarks of CHEMetrics Inc.

4295 Catlett Road, Midland, VA 22728 ▪ P: 800.356.3072 ▪ F: 540.788.4856 ▪ www.chemetrics.com

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

CHEMetrics, Inc.

Chemwatch Hazard Alert Code:

Chemwatch: **9-87557**
SDS No: **R9402**
Version No: **3.6**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **03/02/2018**
Print Date: **03/02/2018**
Initial Date: **03/02/2018**
S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test
Synonyms	Not Available
Proper shipping name	Chemical kits; First aid kits
Chemical formula	Not Applicable
Other means of identification	Not Available
CAS number	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Component of water analysis reagent sets: Refills R-9400, R-9423 and Kits I-2017, K-9400

Details of the supplier of the safety data sheet

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland VA 22728 - United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency telephone number

Association / Organisation	ChemTel, Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification	Acute Toxicity (Oral) Category 4, Acute Toxicity (Inhalation) Category 3, Skin Corrosion/Irritation Category 2, Serious Eye Damage Category 1, Carcinogenicity Category 2, Reproductive Toxicity Category 2, Specific target organ toxicity - repeated exposure Category 2

Label elements

Hazard pictogram(s)	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H302	Harmful if swallowed.
H331	Toxic if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Continued...

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P310	Immediately call a POISON CENTER or doctor/physician.
P362	Take off contaminated clothing and wash before reuse.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P330	Rinse mouth.
P332+P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-66-3	71	chloroform
7732-18-5	26	water
13472-35-0	2	sodium phosphate, monobasic, dihydrate
7664-93-9	1	sulfuric acid
61-73-4	<0.1	methylene blue
Not Available	<0.1	Proprietary ingredient

SECTION 4 FIRST AID MEASURES

Description of first aid measures

General	
Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	NOTE: IN massive chloroform overdose,DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration If poisoning occurs, contact a doctor or Poisons Information Centre. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Continued...

- If swallowed do **NOT** induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

For chloroform intoxications:
Chloroform concentrations may be determined in blood.
Treat irritation symptomatically.
Oral Management:
Chloroform is radiopaque and X-rays confirm ingestion.
DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration.
Consider gastric lavage within 1 hour of ingestion because of very rapid absorption of chloroform (use cuffed ET tube to protect airway)
Contact a poisons information service for further guidance on gut decontamination.
Systematic Management.
All patients initially require at least 24 hours observation with ECG monitoring.
Patients should be kept at complete bed rest, the use of stimulants (including adrenaline and noradrenaline) should be avoided because of the risk of sensitisation of the myocardium.
In symptomatic patients the hepatic and renal function should be monitored for at least 3-days post-exposure.
Chest X-rays will be necessary to monitor development of respiratory complications.
Chloroform depletes glutathione stores; N-acetylcysteine (used in the treatment of paracetamol overdose) has been suggested as a possible antidote for hepatotoxic organic solvents (success in carbon tetrachloride intoxications has been reported).
for intoxication due to Freons/ Halons;
A: Emergency and Supportive Measures
- Maintain an open airway and assist ventilation if necessary
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:
- There is no specific antidote

C: Decontamination
- Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:
- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition
- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- No specific antidote.
- Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- If lavage is performed, suggest endotracheal and/or esophageal control.
- Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- Treatment based on judgment of the physician in response to reactions of the patient

For acute or short term repeated exposures to strong acids:
- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:
- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- **DO NOT** attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:
- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:
- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjuctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT** use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Continued...

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use fire fighting procedures suitable for surrounding area. ▸ **DO NOT** approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location. ▸ If safe to do so, remove containers from path of fire. ▸ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	▸ Non combustible. ▸ Not considered to be a significant fire risk. ▸ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ May emit corrosive, poisonous fumes. May emit acrid smoke. carbon dioxide (CO_2) hydrogen chloride phosgene other pyrolysis products typical of burning organic material. May emit poisonous fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Water spray or fog may be used to disperse / absorb vapour. ▸ Contain or absorb spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▸ If contamination of drains or waterways occurs, advise emergency services.

	Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to contact humans, exposed food or food utensils. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. **Wear impact- and splash-resistant eyewear.**
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. **For optimum analyical performance, store in the dark and at room temperature.**

Conditions for safe storage, including any incompatibilities

Suitable container	▸ **DO NOT** use aluminium or galvanised containers ▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.

Continued...

	For low viscosity materials ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ▸ Removable head packaging; ▸ Cans with friction closures and ▸ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.
Storage incompatibility	Chloroform ▸ decomposes in the presence of excess water, high temperature, including hot surfaces, evolving phosgene and hydrogen chloride ▸ on contact with warm water may form hydrogen chloride ▸ decomposes at ordinary temperatures in sunlight, in the absence of air, and in the dark in the presence of air ▸ may form explosive materials when mixed with strong bases, alkali metals, lithium, sodium, potassium, sodium-potassium alloys; these may be heat-, friction-, and/or impact sensitive ▸ reacts violently with light metals, aluminium, magnesium or titanium powder, disilane, potassium tert-butoxide, methylates (methoxides), potassium acetylene-1,2-dioxide, sodium amide, uranium(III) hydride ▸ reacts violently with (acetone + a base), (perchloric acid + phosphorous pentoxide), (KOH + methanol) and (NaOH + methanol). ▸ is incompatible with acetone, beryllium, decaborane, methanol, nitrogen tetroxide, strong oxidisers, fluorine, oxygen, potassium, sodium, strong mineral acids, triisopropylphosphine, chemically active metals (Li, NaK alloy), zinc ▸ attacks many plastics and rubber ▸ attacks iron and other metals in the presence of moisture and elevated temperatures ▸ may generate electrostatic charges due to low conductivity Haloalkanes: ▸ are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results. ▸ may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents. ▸ may produce explosive compounds following prolonged contact with metallic or other azides ▸ may react on contact with potassium or its alloys - although apparently stable on contact with a wide rage of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures . BRETHERICK L.: Handbook of Reactive Chemical Hazards ▸ react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li),calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys. ▸ may react with brass and steel. ▸ may react explosively with strong oxidisers ▸ may degrade rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene, paint and coatings ▸ Avoid strong bases.

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US NIOSH Recommended Exposure Limits (RELs)	chloroform	Methane trichloride, Trichloromethane	Not Available	9.78 mg/m3 / 2 ppm	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	chloroform	Chloroform	10 ppm	Not Available	Not Available	TLV® Basis: Liver & embryo/fetal dam; CNS impair
US OSHA Permissible Exposure Levels (PELs) - Table Z1	chloroform	Chloroform (Trichloromethane)	Not Available	Not Available	240 mg/m3 / 50 ppm	Not Available
US NIOSH Recommended Exposure Limits (RELs)	sulfuric acid	Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous)	1 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	sulfuric acid	Sulfuric acid	0.2 mg/m3	Not Available	Not Available	TLV® Basis: Pulm func
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sulfuric acid	Sulfuric acid	1 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
chloroform	Chloroform	2 ppm	Not Available	Not Available
sulfuric acid	Sulfuric acid	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
chloroform	500 ppm	Not Available
water	Not Available	Not Available

Continued...

sodium phosphate, monobasic, dihydrate	Not Available	Not Available
sulfuric acid	15 mg/m3	Not Available
methylene blue	Not Available	Not Available
Proprietary ingredient	Not Available	Not Available

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection.
Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.
An approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Personal protection

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

Skin protection

See Hand protection below

Hands/feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber

Body protection

See Other protection below

Other protection

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

Thermal hazards

Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:

Respiratory protection

Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
Degree of protection varies with both face-piece and Class of filter; the nature of protection

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
TEFLON	C
VITON	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AB-AUS P2	-	AB-PAPR-AUS / Class 1 P2
up to 50 x ES	-	AB-AUS / Class 1 P2	-
up to 100 x ES	-	AB-2 P2	AB-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Two phase: Blue / Colorless

Physical state	Liquid	**Relative density (Water = 1)**	1.49 (chloroform layer)
Odour	Characteristic	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	1.35 (aqueous layer)	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Partly miscible	**pH as a solution**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Continued...

Inhaled	Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Exposure to vapours of some rare earth salts can cause sensitivity to heat, itching, and increased sensitivity of smell and taste. Other effects include inflamed airways and lung, emphysema, regional narrowing of terminal airways and cell changes. Chloroform concentrations of 1000-2000 parts per million (ppm) may cause dizziness, headache, fatigue, salivation and nausea. 4000 ppm may cause vomiting, serious disorientation and a fainting feeling. 14000-16000 ppm may cause rapid loss of consciousness. More than 20000 ppm may cause breathing failure, heart rhythm disturbances and death. If death does not immediately occur from stoppage of breathing or heart beat, it may occur later from liver and kidney damage. Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved. Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin)
Ingestion	The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum. Symptoms of chloroform ingestion include burning of the mouth, throat, gullet and stomach; diarrhoea and abdominal/lower chest pain; cold, clammy skin, blueness of the extremities and face, muscle cramps, dilated pupils, low blood pressure, blood vessel dilatation on the periphery, irregular breathing, respiratory failure, unconsciousness and liver damage. Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.
Skin Contact	The material may accentuate any pre-existing dermatitis condition Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.
Eye	If applied to the eyes, this material causes severe eye damage. Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.
Chronic	Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility. Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Long term exposure to chloroform may produce dizziness, fatigue, drowsiness, memory impairment, increased dreams, loss of appetite, palpitations, liver and kidney damage. There may be depression, confusion, negative changes in behaviour and passive mood states. Chronic abuse of chloroform may cause psychotic behaviour. Repeated exposure may also cause dullness, urinary frequency, gastrointestinal disturbances, dry mouth, thirst, headache, general unwellness, blurred vision, ‘pins and needles’, loss of sense of balance, tremors, memory and anaemia. It may be dangerous to the foetus (unborn baby). It has been shown to induce liver, kidney, intestinal and urinary bladder tumours, including cancer.

	TOXICITY	IRRITATION
Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test		

	TOXICITY	IRRITATION
Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test		

CHLOROFORM	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [*National Toxicology Program: U.S. Dep. of Health & Human Services 2002*]
WATER	No significant acute toxicological data identified in literature search.
SODIUM PHOSPHATE, MONOBASIC, DIHYDRATE	Data for anhydride
SULFURIC ACID	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.

Continued...

	WARNING: For inhalation exposure ONLY: This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS** Occupational exposures to strong inorganic acid mists of sulfuric acid:
METHYLENE BLUE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing. After i.v. administration Methylene Blue may cause nausea, vomiting, abdominal and chest pain, headache, dizziness, mental confusion, profuse sweating, and hypertension; with very high doses methaemoglobinemia and ahemolysis may occur. Methylene Blue activates a normally dormant reductase enzyme system which reduces the methylene blue to leucomethylene blue, which in turn is able to reduce methaemoglobin to haemoglobin. Methylene Blue is absorbed from the gastrointestinal tract. It is believed to be reduced in the tissues to the leuco form which is slowly excreted, mainly in the urine together with some unchanged drug. Methylene Blue imparts a blue color to urine and faeces. In large doses Methylene Blue can produce methaemoglobinaemia. Although intra-amniotic injection of Methylene Blue has been used to diagnose premature rupture of fetal membranes or to identify separate amniotic sacs in twin pregnancies, there have been several reports of hemolytic anemia (Heinz-body anemia) and hyperbilirubinemia in neonates exposed to Methylene Blue in the amniotic cavity. In most cases, exchange transfusions and/or phototherapy are required to control the jaundice. Methylene Blue should be used with caution in the treatment of toxic methemoglobinemia; high doses can cause hemolytic anemias and patients with glucose-6-phosphate dehydrogenase (G6PD) deficiencies are particularly susceptible. A rapid disappearance of cyanosis in response to Methylene Blue would be expected within one hour but might not occur if the patient has erythrocyte G6PD or NADPH-diaphorase deficiency or if methemoglobinemia is due to the ingestion of compounds such as aniline or dapsone. A second dose has been recommended if cyanosis does not disappear within 1 hour of Methylene Blue administration but results of a study in animals and of a patient with aniline poisoning indicated that an increased dosage of Methylene Blue might be of no additional benefit and could be potentially dangerous in that it could enhance Heinz body formation. Methylene Blue should not be injected s.c. as it may cause necrotic abscesses. It should not be given by intrathecal injection as neural damage has occurred. Methylene Blue should be used with caution in patients with glucose-6-phosphate dehydrogenase deficiency.

Acute Toxicity	✔	**Carcinogenicity**	✔
Skin Irritation/Corrosion	✔	**Reproductivity**	✔
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	✔
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✔ *– Data available to make classification*
✘ *– Data available but does not fill the criteria for classification*
⊘ *– Data Not Available to make classification*

CMR STATUS

Not Applicable

REPROTOXIN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
CARCINOGEN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
MUTAGEN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
EYE	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
RESPIRATORY	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
SKIN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

NOT AVAILABLE

Ingredient	Endpoint	Test Duration (hr)	Effect	Value	Species	BCF
Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
chloroform	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
water	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sodium phosphate, monobasic, dihydrate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sulfuric acid	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
methylene blue	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

For Haloalkanes:
Atmospheric Fate: Fully, or partially, fluorinated haloalkanes released to the air can restrict heat loss from the Earth's atmosphere by absorbing infrared emissions from the surface. The major fate of haloalkanes in the atmosphere is via breakdown by hydroxyl radicals. These substances react with atmospheric ozone and nitrates, which also causes them to change, (transform). Chlorofluorocarbons, (CFC), haloalkanes can break down into chlorine atoms in the air, which also contribute to ozone destruction.
Terrestrial Fate: Biological breakdown of these substances is expected to be faster than non-biological breakdown, provided that there are sufficient substrates, nutrients and microbial populations. However, because haloalkane-degrading microorganisms are not easily found, biological breakdown of these substances is rare. Several methane-utilizing bacteria have been identified that may use haloalkanes. Biological breakdown may occur through various pathways.
Aquatic Fate: Haloalkanes do not easily break down in water. Biological breakdown of these substances is expected to be faster than non-biological breakdown, provided that there are sufficient substrates, nutrients and microbial populations. In general, alpha- and alpha, omega-chlorinated haloalkanes are de-halogenated by water. Alpha- and alpha, omega-haloalkanes with longer chains, may be de-halogenated by the addition of oxygen, (oxidized). Haloalkanes may break down in water, if certain sulfur ions are present, such as bisulfide ions.

Continued...

Ecotoxicity: Haloparaffins C12 to C18 may be incorporated into fatty acids in bacteria, yeasts, and fungi, resulting in their build up in the food chain. Haloalkanes are persistent and toxic to fish and wildlife.

Ecotoxicity:
The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5
For Chloroform:
log Kow: 1.97; Koc: 34; Half-life (hr) air: 1920; Half-life (hr) H2O surface water: 28 744; Henry's atm m3/mol: 4.35E-03; BOD 5: 0.02; ThOD: 0.33,1.346; BCF: 1.9-10.35. Drinking Water Standard - Hydrocarbon total: 10 ug/l (UK max.); Chloroform: 200 ug/l (WHO guideline); Soil Guidelines - Dutch criteria: 0.001 mg/kg.
Atmospheric Fate: Chloroform will generally evaporate to atmosphere; however, transportation may occur over long distances and photo-oxidization will occur (half-life 80 days). Chloroform is expected to exist almost entirely in the vapor phase in the atmosphere. Large amounts of chloroform in the atmosphere may be removed during precipitation; however, most chloroform removed in precipitation is likely to re-enter the atmosphere by volatilization. Long-range atmospheric transport of chloroform is possible. The major degradation process in the air involves reactions with free radicals such as hydroxyl groups. Breakdown products include phosgene and hydrogen chloride. Chloroform is more reactive in photochemical smog conditions where the approximate half-life is 11 days.
Aquatic Fate: Direct photolysis of chloroform will not be a significant degradation process in surface waters and the dominant fate process for chloroform in surface waters is volatilization. Chloroform present in surface water is expected to volatilize rapidly to the atmosphere. A half-life of 44 hours for volatilization has been estimated.
Terrestrial Fate: Spills and releases on land will evaporate quickly or leach into groundwater where they persist for long periods. Chloroform is not expected to adsorb significantly to sediment or suspended organic matter in surface waters. In soil, the dominant transport mechanism for chloroform near the surface will probably be volatilization with relatively constant rates over a wide variety of soil types.
Ecotoxicity: Chloroform is not expected to concentrate in the food chain. Chloroform does not appear to bioconcentrate in higher aquatic organisms including bluegill sunfish but, has a moderate tendency to concentrate in nonvascular aquatic plants such as green algae. Significant degradation of chloroform under aerobic conditions has been reported in tests. Under the proper conditions, chloroform appears to be much more susceptible to anaerobic biodegradation. Above certain dosage levels, chloroform becomes toxic to anaerobic and aerobic microorganisms. This is especially noticeable for biological treatment facilities that use anaerobic digestion systems, where sustained inputs with chloroform concentrations approaching 100 mg/L can all but eliminate methane fermenting bacteria.
For Cerium:
Environmental Fate: Despite their name, rare earth elements are relatively plentiful in the Earth's crust, with cerium being the 25th most abundant element. Cerium compounds include cerium oxide, cerium carbonate, and cerium chloride.
Atmospheric Fate: Cerium oxidizes very readily at room temperature, especially in moist air. Except for europium, cerium is the most reactive of the rare-earth metals.
Terrestrial Fate: Soil ◆ Cerium is found in minerals including allanite, monazite, cerite, and bastnaesite. Plants ◆ Crops can take up cerium.
Aquatic Fate: Cerium oxide and cerium carbonate are insoluble in water, while cerium chloride is soluble in water. Cerium has affinity for humic substances, which may alter its availability in aquatic systems. The substance slowly decomposes in cold water, and rapidly decomposes in hot water. Alkali solutions and dilute/concentrated acids attack the metal rapidly.
Ecotoxicity: Current fate and transport studies are limited and may not adequately address long term environmental exposure risks to both humans and other living organisms. Although cerium has low acute toxicity, long term health and environmental effects are less well understood. The form cerium takes can also influence its biological and environmental fate. Oxides and hydroxides of cerium are poorly soluble in body fluids thus are slow to clear from the organism. Cerium can affect the respiratory tract and associated lymph nodes, (inhalation exposure), and, once in the circulatory system, can partition to the skeleton, liver, kidney and spleen. Studies subjecting animals to large dosages of cerium show evidence of neurological effects, possibly due to cerium competing with calcium binding sites in the brain. Long term human expose to cerium is correlated with rare earth pneumoconiosis, but, the precise role of cerium in this disease is not well characterized.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
chloroform	HIGH (Half-life = 1800 days)	HIGH (Half-life = 259.63 days)
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
chloroform	LOW (BCF = 13)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
chloroform	LOW (KOC = 35.04)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ ▸ ▸ **Dispose of according to federal, state, and local regulations.** ▸

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Continued...

Land transport (DOT)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kits; First aid kits
Environmental hazard	No relevant data
Transport hazard class(es)	Class: 9
Special precautions for user	Hazard Label: 9 Special provisions: 15

Air transport (ICAO-IATA / DGR)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kit; First aid kit
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class: 9 ICAO / IATA Subrisk: Not Applicable ERG Code: 9L
Special precautions for user	Special provisions: A44 A163 Cargo Only Packing Instructions: 960 Cargo Only Maximum Qty / Pack: 10 kg Passenger and Cargo Packing Instructions: 960 Passenger and Cargo Maximum Qty / Pack: 10 kg Passenger and Cargo Limited Quantity Packing Instructions: Y960 Passenger and Cargo Limited Maximum Qty / Pack: 1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3316
Packing group	II
UN proper shipping name	CHEMICAL KIT or FIRST AID KIT
Environmental hazard	Not Applicable
Transport hazard class(es)	IMDG Class: 9 IMDG Subrisk: Not Applicable
Special precautions for user	EMS Number: F-A , S-P Special provisions: 251 340 Limited Quantities: See SP251

Transport in bulk according to Annex II of MARPOL and the IBC code

Source	Ingredient	Pollution Category
	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

chloroform(67-66-3) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US - Alaska Limits for Air Contaminants","US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens","US - California Proposition 65 - Reproductive Toxicity","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts - Right To Know Listed Chemicals","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Priority Pollutants","US CWA (Clean Water Act) - Toxic Pollutants","US EPA Carcinogens Listing","US EPCRA Section 313 Chemical List","US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US National Toxicology Program (NTP) 14th Report Part B. Reasonably Anticipated to be a Human Carcinogen","US NIOSH Recommended Exposure Limits (RELs)","US Office of Environmental Health Hazard Assessment Proposition 65 No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity","US

Continued...

	OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances","US TSCA New Chemical Exposure Limits (NCEL)"
water(7732-18-5) is found on the following regulatory lists	"US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances"
sodium phosphate, monobasic, dihydrate(13472-35-0) is found on the following regulatory lists	"US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances"
sulfuric acid(7664-93-9) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft","US - Alaska Limits for Air Contaminants","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts - Right To Know Listed Chemicals","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CWA (Clean Water Act) - List of Hazardous Substances","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US EPCRA Section 313 Chemical List","US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances"
methylene blue(61-73-4) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"
Proprietary ingredient() is found on the following regulatory lists	"Not Applicable"

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
Not Available	Not Available

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R1001

Version No.: 2.2

Product Name: CHEMets® Ampoules for Filming Amines CHEMets® Kit & Refill (R-1001) and for Detergents CHEMets® Kit & Refill (R-9401)

Component of water analysis reagent sets: Refills R-1000, R-1000E, R-9400, R-9404 and Test Kits K-1001, K-1001E, K-9400, K-9404

Product Descriptions:

CHEMets Ampoules: Sealed glass ampoules, 7 mm OD, for visual colorimetric water analysis. Each CHEMet™ ampoule contains approximately 0.25 mL of liquid reagent sealed under vacuum. The refills and kits contain 20 CHEMets ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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4295 Catlett Road, Midland, VA 22728 ▪ P: 800.356.3072 ▪ F: 540.788.4856 ▪ www.chemetrics.com

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

CHEMetrics, Inc.

Chemwatch Hazard Alert Code: 3

Chemwatch: **9-92655**
SDS No: **R1001**
Version No: **2.2**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **03/11/2014**
Print Date: **12/03/2015**
Initial Date: **05/11/2014**
S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)
Synonyms	Not Available
Proper shipping name	Chemical kits|First aid kits
Chemical formula	Not Applicable
Other means of identification	Not Available
CAS number	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Component of water analysis reagent sets: refills R-1000, R-1000E, R-9400, R-9404 and test kits K-1001, K-1001E, K-9400, K-9404

Details of the manufacturer/importer

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland, VA. 22728 United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency telephone number

Association / Organisation	ChemTel Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification	Flammable Liquid Category 3, Serious Eye Damage Category 1, STOT - SE (Narcosis) Category 3

Label elements

GHS label elements	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H226	Flammable liquid and vapour
H318	Causes serious eye damage
H336	May cause drowsiness or dizziness

Precautionary statement(s) Prevention

Continued...

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P240	Ground/bond container and receiving equipment.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor/physician/first aider
P370+P378	In case of fire: Use alcohol resistant foam or fine spray/water fog for extinction.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
71-23-8	98	n-propanol
7732-18-5	2	water

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Indication of any immediate medical attention and special treatment needed

To treat poisoning by the higher aliphatic alcohols (up to C7):

- Gastric lavage with copious amounts of water.
- It may be beneficial to instill 60 ml of mineral oil into the stomach.
- Oxygen and artificial respiration as needed.
- Electrolyte balance: it may be useful to start 500 ml. M/6 sodium bicarbonate intravenously but maintain a cautious and conservative attitude toward electrolyte replacement unless shock or severe acidosis threatens.
- To protect the liver, maintain carbohydrate intake by intravenous infusions of glucose.
- Haemodialysis if coma is deep and persistent. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, Ed 5)

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for shock.
- Monitor and treat, where necessary, for pulmonary oedema.
- Anticipate and treat, where necessary, for seizures.

Continued...

- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- Give activated charcoal.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- If the patient is hypoglycaemic (decreased or loss of consciousness, tachycardia, pallor, dilated pupils, diaphoresis and/or dextrose strip or glucometer readings below 50 mg), give 50% dextrose.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- Acidosis may respond to hyperventilation and bicarbonate therapy.
- Haemodialysis might be considered in patients with severe intoxication.
- Consult a toxicologist as necessary. BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For C8 alcohols and above.
Symptomatic and supportive therapy is advised in managing patients.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

	▸ Alcohol stable foam. ▸ Dry chemical powder. ▸ BCF (where regulations permit). ▸ Carbon dioxide. ▸ Water spray or fog - Large fires only.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area. ▸ Avoid spraying water onto liquid pools.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). ▸ May emit acrid smoke.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb small quantities with vermiculite or other absorbent material.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

	Personal Protective Equipment advice is contained in Section 8 of the MSDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked.

Continued...

	Wear impact- and splash-resistant eyewear. Break the ampoule tip only when it is completely immersed in sample. Breaking the tip in air may cause the glass ampoule to shatter.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. **For optimum analytical performance, store in the dark and at room temperature.**

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	Alcohols ▸ are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. ▸ reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen ▸ react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzincs, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium ▸ should not be heated above 49 deg. C. when in contact with aluminium equipment

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	n-propanol	n-Propyl alcohol	500 mg/m3 / 200 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	n-propanol	n-Propanol (n-Propyl alcohol)	100 ppm	Not Available	Not Available	TLV® Basis: Eye & URT irr
US NIOSH Recommended Exposure Limits (RELs)	n-propanol	Ethyl carbinol, 1-Propanol, n-Propanol, Propyl alcohol	500 mg/m3 / 200 ppm	625 mg/m3 / 250 ppm	Not Available	[skin]

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
n-propanol	Propyl alcohol, n-; (n-Propanol)	250 ppm	250 ppm	4000 ppm

Ingredient	Original IDLH	Revised IDLH
n-propanol	4,000 ppm	800 ppm
water	Not Available	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and.has to be observed when making a final choice. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: ▸ frequency and duration of contact, ▸ chemical resistance of glove material, ▸ glove thickness and ▸ dexterity

Continued...

	Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C. apron. ▸ Barrier cream. ▸ Skin cleansing cream.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

Material	CPI
NEOPRENE	A
VITON	B
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PVA	C
PVC	C
TEFLON	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	Air-line*	A-2	A-PAPR-2 ^
up to 20 x ES	-	A-3	-
20+ x ES	-	Air-line**	-

* - Continuous-flow; ** - Continuous-flow or positive pressure demand
^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	colorless, may contain black particles

Physical state	Liquid	**Relative density (Water = 1)**	0.8
Odour	Characteristic	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	413
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	-127	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	97	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	23	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Flammable.	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	13.5	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	2.1	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution**	8.5
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7

Continued...

Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Subjects unacclimatised to n-propanol exposure experienced mild irritation of the eyes, nose and throat at a concentration of 400 parts per million.
Ingestion	Overexposure to non-ring alcohols causes nervous system symptoms. These include headache, muscle weakness and inco-ordination, giddiness, confusion, delirium and coma. The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. The calculated human skin permeability coefficient for n-propanol by the U.S. Environment Protection Agency is 1.3 x 10-3 cm/hr. Most liquid alcohols appear to act as primary skin irritants in humans. Significant percutaneous absorption occurs in rabbits but not apparently in man.
Eye	If applied to the eyes, this material causes severe eye damage.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. N-propanol is shown to cause dose dependent severe liver injury, malignant tumours (blood and liver cancers) and benign tumours in rats. There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	**TOXICITY**	**IRRITATION**
CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	**TOXICITY**	**IRRITATION**

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	No significant acute toxicological data identified in literature search. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	✔
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✔ *– Data required to make classification available*
✘ *– Data available but does not fill the criteria for classification*
⊘ *– Data Not Available to make classification*

CMR STATUS

SKIN	n-propanol	US - Hawaii Air Contaminant Limits - Skin Designation|US NIOSH Recommended Exposure Limits (RELs) - Skin|US - Washington Permissible exposure limits of air contaminants - Skin|US - California Permissible Exposure Limits for Chemical Contaminants - Skin	X|[skin]|S

Continued...

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

For n-Propanol: log Kow: 0.25-0.34;
Half-life (hr) air: 6.7;
Half-life (hr) H2O surface water: 6.5;
Henry's atm m3 /mol: 6.85E-06;
BOD 5: 1.43-1.6 g O2/g;
BOD 20: <2 g O2/g;
COD : 91%;
ThOD : 1.8 g;
O2/gBCF: 0.7.
Aquatic Fate: High biochemical oxygen demand and a potential to cause oxygen depletion in aqueous systems, a low potential to affect aquatic organisms, a low potential to affect secondary waste treatment microbial metabolism. n-Propanol is expected to biodegrade and is not expected to persist for long periods in aquatic environments. When diluted with a large amount of water, n-propanol is not expected to have a significant impact.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
n-propanol	LOW	LOW
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
n-propanol	LOW (LogKOW = 0.25)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
n-propanol	HIGH (KOC = 1.325)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	**Dispose of according to federal, state, and local regulations.**

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Land transport (DOT)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kits; First aid kits
Environmental hazard	No relevant data
Transport hazard class(es)	Class | 9
Special precautions for user	Special provisions | 15

Air transport (ICAO-IATA / DGR)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kit †; First aid kit †
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class | 9 ICAO / IATA Subrisk | Not Applicable ERG Code | 9L

Continued...

Special precautions for user	Special provisions	A44 A163
	Cargo Only Packing Instructions	960
	Cargo Only Maximum Qty / Pack	10 kg
	Passenger and Cargo Packing Instructions	960
	Passenger and Cargo Maximum Qty / Pack	10 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y960
	Passenger and Cargo Limited Maximum Qty / Pack	1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3316
Packing group	II
UN proper shipping name	CHEMICAL KIT or FIRST AID KIT
Environmental hazard	Not Applicable
Transport hazard class(es)	IMDG Class: 9 IMDG Subrisk: Not Applicable
Special precautions for user	EMS Number: F-A , S-P Special provisions: 251 340 Limited Quantities: See SP251

Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	n-propanol	Y

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

n-propanol(71-23-8) is found on the following regulatory lists	"US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Idaho - Limits for Air Contaminants","US - Hawaii Air Contaminant Limits","US - California Permissible Exposure Limits for Chemical Contaminants","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Oregon Permissible Exposure Limits (Z-1)","US - Michigan Exposure Limits for Air Contaminants","US NIOSH Recommended Exposure Limits (RELs)","US - Alaska Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US ACGIH Threshold Limit Values (TLV)","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US OSHA Permissible Exposure Levels (PELs) - Table Z1"
water(7732-18-5) is found on the following regulatory lists	"US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name Ammonia Salicylate Reagent

Other means of identification
Product Code(s) 2653299

Safety data sheet number M00127

Recommended use of the chemical and restrictions on use
Recommended Use Laboratory Use. Reagent for ammonia test.
Uses advised against None.
Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland,
CO 80539 USA +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service +1(515)232-2533 - 8am - 4pm CST

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 1
Respiratory sensitization	
Skin sensitization	
Mutagenicity	
Carcinogenicity	
Reproductive toxicity	
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word - Danger
- Warning

Hazard statements

H302 - Harmful if swallowed
H315 - Causes skin irritation
H318 - Causes serious eye damage
H335 - May cause respiratory irritation

Precautionary statements
P270 - Do not eat, drink or smoke when using this product
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P330 - Rinse mouth
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P332 + P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash before reuse
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P271 - Use only outdoors or in a well-ventilated area
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/ container to an approved waste disposal plant

Other Information
Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Not applicable

Mixture

Chemical Family Mixture.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Sodium salicylate	54-21-7	40 - 50%	-
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	868-18-8	7 - 13%	-
Sodium nitroferricyanide	14402-89-2	<1%	-
m-Nitrophenol	554-84-7	<1%	-

Chemical name	CAS No.	Weight-%
Sodium salicylate 54-21-7	54-21-7	44.2
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt 868-18-8	868-18-8	12.6
Sodium nitroferricyanide 14402-89-2	14402-89-2	0.95
m-Nitrophenol	554-84-7	0.25

554-84-7

4. FIRST AID MEASURES

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur. IF exposed or concerned: Get medical advice/attention.

Eye contact Get immediate medical advice/attention. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area.

Skin contact Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.

Ingestion Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Call a physician.

Self-protection of the first aider Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical No information available.

Hazardous combustion products May emit acrid smoke and fumes.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Use personal protective equipment as required.

Ensure adequate ventilation. Evacuate personnel to safe areas.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Ensure adequate ventilation. Avoid breathing vapors or mists. In case of insufficient ventilation, wear suitable respiratory equipment.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Store locked up.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium nitroferricyanide CAS#: 14402-89-2	TWA: 1 mg/m^3	TWA: 5 mg/m^3 (vacated) TWA: 1 mg/m^3 (vacated) TWA: 5 mg/m^3 *	IDLH: 25 mg/m^3 CN TWA: 1 mg/m^3 Fe

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves. Impervious gloves.

Eye/face protection Tight sealing safety goggles.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing.

General Hygiene Considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid
Appearance powder
Color Tan
Odor Odorless
Odor threshold No data available

Property	Values	Remarks • Method
Molecular weight	No data available	
pH	7.84	5% Solution
Melting point/freezing point	97 °C / 207 °F	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	1.689	
Partition Coefficient (n-octanol/water)	log K_{ow} ~ -0.6	
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ -0.84	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other Information

Metal Corrosivity

Steel Corrosion Rate Not applicable
Aluminum Corrosion Rate Not applicable

Volatile Organic Compounds (VOC) Content
Not applicable

Chemical name	CAS No.	CAA (Clean Air Act)
Sodium salicylate	54-21-7	-
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	868-18-8	-
Sodium nitroferricyanide	14402-89-2	-
m-Nitrophenol	554-84-7	-

Explosive properties

Upper explosion limit No data available
Lower explosion limit No data available

Flammable properties

Flash point Not applicable
Method No information available

Flammability Limit in Air
Upper flammability limit: No data available
Lower flammability limit: No data available

Oxidizing properties No data available.

Bulk density No data available

Particle Size No information available

Particle Size Distribution No information available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stability Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions
Possibility of Hazardous Reactions None under normal processing.

Hazardous polymerization
None under normal processing.

Conditions to avoid

Conditions to avoid None known based on information supplied.

Incompatible materials

Incompatible materials Strong acids. Strong bases. Strong oxidizing agents.

Hazardous Decomposition Products

Cyanide. Nitrogen oxides. Sodium oxides.

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Product Information

Inhalation May cause irritation of respiratory tract.

Eye contact Severely irritating to eyes. Causes serious eye damage. May cause burns. May cause irreversible damage to eyes.

Skin contact Causes skin irritation.

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Harmful if swallowed.

Symptoms Redness. Burning. May cause blindness. May cause redness and tearing of the eyes.

Aggravated Medical Conditions Skin disorders. Eye disorders. Respiratory disorders.

Toxicologically synergistic products Exposure to and/or consumption of alcohol may increase toxic effects of this product.

Toxicokinetics, metabolism and distribution See ingredients information below.

Chemical name	Toxicokinetics, metabolism and distribution
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Sodium Salicylate is the sodium salt of salicylic acid which is the precursor of aspirin.
m-Nitrophenol (<1%) CAS#: 554-84-7	Based on the rapid urinary elimination of the mononitrophenols, the compounds may be restricted primarily to the blood and urine following absorption by humans.

Product Acute Toxicity Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Unknown Acute Toxicity

0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	1,666.00 mg/kg
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available

ATEmix (inhalation-gas)	No information available

Ingredient Acute Toxicity Data

Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Rat LD_{50}	930 mg/kg	None reported	**Behavioral** Convulsions or effect on seizure threshold Muscle contraction or spasticity	RTECS (Registry of Toxic Effects of Chemical Substances)
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	Mouse LD_{50}	4360 mg/kg	None reported	None reported	EPA (United States Environmental Protection Agency)
Sodium nitroferricyanide (<1%) CAS#: 14402-89-2	Rat LD_{50}	99 mg/kg	None reported	None reported	LOLI
m-Nitrophenol (<1%) CAS#: 554-84-7	Rat LD_{50}	328 mg/kg	None reported	None reported	Vendor SDS
Chemical name	**Endpoint type**	**Reported dose**	**Exposure time**	**Toxicological effects**	**Key literature references and sources for data**
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Mouse LD_{50}	540 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	Rabbit LD_{50}	5290 mg/kg	None reported	None reported	EPA (United States Environmental Protection Agency)
m-Nitrophenol (<1%) CAS#: 554-84-7	Dog LD_{50}	83 mg/kg	None reported	None reported	Vendor SDS

Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Human LD_{Lo}	700 mg/kg	None reported	**Lungs, Thorax, or Respiration** Dyspnea	RTECS (Registry of Toxic Effects of Chemical Substances)

Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Aspiration toxicity

If available, see data below
Kinematic viscosity Not applicable

Product Skin Corrosion/Irritation Data
No data available.

Ingredient Skin Corrosion/Irritation Data
If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Standard Draize Test	Rabbit	500 mg	4 hours	Mild skin irritant	No information available
m-Nitrophenol (<1%) CAS#: 554-84-7	Standard Draize Test	Rabbit	20 mg	24 hours	Skin irritant	RTECS (Registry of Toxic Effects of Chemical Substances)

Product Serious Eye Damage/Eye Irritation Data
No data available.

Ingredient Eye Damage/Eye Irritation Data
If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Standard Draize Test	Rabbit	100 mg	1 hours	Corrosive to eyes	ECHA (The European Chemicals Agency)
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	None reported	Human	None reported	None reported	Not corrosive or irritating to eyes	ECHA (The European Chemicals Agency)
m-Nitrophenol (<1%) CAS#: 554-84-7	Standard Draize Test	Rabbit	5 mg	24 hours	Corrosive to eyes	RTECS (Registry of Toxic Effects of Chemical Substances)

Sensitization Information

Product Sensitization Data
Skin Sensitization Exposure Route No data available.
Respiratory Sensitization Exposure Route No data available.

Ingredient Sensitization Data
Skin Sensitization Exposure Route If available, see data below.

Chemical name	Test method	Species	Results	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Based on human experience	Human	Not confirmed to be a skin sensitizer	Vendor SDS
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	None reported	Human	Not confirmed to be a skin sensitizer	ECHA (The European Chemicals Agency)

Respiratory Sensitization Exposure Route If available, see data below.

Chemical name	Test method	Species	Results	Key literature references and sources for data
Sodium salicylate	Based on human	Human	Not confirmed to be a respiratory	Vendor SDS

(40 - 50%) CAS#: 54-21-7	experience		sensitizer	
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	None reported	Human	Not confirmed to be a skin sensitizer	ECHA (The European Chemicals Agency)

Chronic Toxicity Information

Product Specific Target Organ Toxicity Repeat Dose Data

Oral Exposure Route No data available.
Dermal Exposure Route No data available.
Inhalation (Dust/Mist) Exposure Route No data available.
Inhalation (Vapor) Exposure Route No data available.
Inhalation (Gas) Exposure Route No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Carcinogenicity Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Carcinogenicity Data

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Sodium salicylate	54-21-7	-	-	-	-
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	868-18-8	-	-	-	-
Sodium nitroferricyanide	14402-89-2	-	-	-	-
m-Nitrophenol	554-84-7	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Germ Cell Mutagenicity *invitro* **Data**

No data available.

Ingredient Germ Cell Mutagenicity *invitro* **Data**

If available, see data below

Chemical name	Test	Cell Strain	Reported	Exposure	Results	Key literature

			dose	time		references and sources for data
m-Nitrophenol (<1%) CAS#: 554-84-7	Mutation in microorganisms	*Salmonella typhimurium*	1 mg/plate	None reported	Positive test result for mutagenicity	CCRIS (Chemical Carcinogenesis Research Information System)
Chemical name	**Test**	**Cell Strain**	**Reported dose**	**Exposure time**	**Results**	**Key literature references and sources for data**
m-Nitrophenol (<1%) CAS#: 554-84-7	DNA repair	Bacillus subtilis	0.5 mg/disc	None reported	Positive test result for mutagenicity	CCRIS (Chemical Carcinogenesis Research Information System)

Product Germ Cell Mutagenicity *invivo* **Data**

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Germ Cell Mutagenicity *invivo* **Data**

Oral Exposure Route If available, see data below

Chemical name	Test	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	DNA damage	Rat	30 mg/L	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of Chemical Substances)

Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Reproductive Toxicity Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Reproductive Toxicity Data

Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Rat TD_{Lo}	40 mg/kg	1 days	**Effects on Newborn** Stillbirth	RTECS (Registry of Toxic Effects of Chemical Substances)
Chemical name	**Endpoint type**	**Reported dose**	**Exposure time**	**Toxicological effects**	**Key literature references and sources for data**
Sodium salicylate (40 - 50%) CAS#: 54-21-7	Rat TD_{Lo}	250 mg/kg	9 days	**Specific Developmental Abnormalities** Musculoskeletal system	RTECS (Registry of Toxic Effects of Chemical Substances)

Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

12. ECOLOGICAL INFORMATION

Ecotoxicity

Product Ecological Data

Aquatic toxicity

Fish No data available
Crustacea No data available
Algae No data available

Ingredient Ecological Data

Aquatic toxicity

Fish If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Sodium salicylate (40 - 50%) CAS#: 54-21-7	96 hours	*Pimephales promelas*	LC_{50}	1370 mg/L	GESTIS (Information System on Hazardous Substances of the German Social Accident Insurance)
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	96 hours	None reported	LC_{50}	612000 mg/L	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™

Crustacea If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	48 Hours	None reported	LC_{50}	263000 mg/L	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™

Algae If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	96 hours	None reported	EC_{50}	623770 mg/L	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™

Other Information

Persistence and degradability

Product Biodegradability Data
No data available.

Ingredient Biodegradability Data

Chemical name	Test method	Biodegradation	Exposure time	Results
Sodium salicylate (40 - 50%) CAS#: 54-21-7	None reported	50%	140 days	Not readily biodegradable
Butanedioic acid,	None reported	73%	14 days	Readily

2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8				biodegradable

Bioaccumulation

Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) log K_{ow} ~ -0.6

Ingredient Bioaccumulation Data

Chemical name	Test method	Exposure time	Species	Bioconcentration factor (BCF)	Results
m-Nitrophenol (<1%) CAS#: 554-84-7	Estimation through BCFBAF v3.01 part of the Estimation Programs Interface (EPI) Suite™	None reported	None reported	BCF = 25.12	Does not have the potential to bioaccumulate

Mobility

Soil Organic Carbon-Water Partition Coefficient log K_{oc} ~ -0.84

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Other adverse effects
Contains a substance with an endocrine-disrupting potential.

Chemical name	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Endocrine disrupting potential
Sodium nitroferricyanide (<1%) CAS#: 14402-89-2	Group III Chemical	-	-

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

Special instructions for disposal Dilute to 3 to 5 times the volume with cold water. Flush system with plenty of water. If permitted by regulation. Open cold water tap completely, slowly pour the material to the drain. Check with national, local municipal and state authorities and waste contractors for pertinent local information on the disposal of this article.

14. TRANSPORT INFORMATION

U.S. DOT	Not regulated
TDG	Not regulated
IATA	Not regulated
IMDG	Not regulated
Note:	No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Sodium nitroferricyanide (CAS #: 14402-89-2)	1.0

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No

Reactive Hazard No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium nitroferricyanide 14402-89-2	-	X	X	-
m-Nitrophenol 554-84-7	-	-	-	X

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
m-Nitrophenol 554-84-7	100 lb	-	RQ 100 lb final RQ RQ 45.4 kg final RQ

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Sodium nitroferricyanide 14402-89-2	X	-	X
m-Nitrophenol 554-84-7	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Butanedioic acid, 2,3-dihydroxy-[R-(R*,R*)]-, disodium salt	-	21 CFR 184.1801

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)
Not applicable

NFPA and HMIS Classifications

NFPA	**Health hazards** - 3	**Flammability** - 0	**Instability** - 0	**Physical and Chemical Properties** -
HMIS	**Health hazards** - 3	**Flammability** - 0	**Physical Hazards** - 0	**Personal protection** - X - See section 8 for more information

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	*Immediately Dangerous to Life or Health*
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	*no data*

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By	Hach Product Compliance Department
Issue Date	16-Sep-2016
Revision Date	20-Dec-2017
Revision Note	None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2017

End of Safety Data Sheet

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name Ammonia Cyanurate

Other means of identification
Product Code(s) 2653199

Safety data sheet number M00128

UN/ID no UN2680

Recommended use of the chemical and restrictions on use
Recommended Use Laboratory Use. Reagent for ammonia test.
Uses advised against None.
Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service +1(515)232-2533 - 8am - 4pm CST

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Chronic aquatic toxicity	Category 3

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word - Danger

Hazard statements

H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H412 - Harmful to aquatic life with long lasting effects

Precautionary statements
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P363 - Wash contaminated clothing before reuse
P405 - Store locked up
P501 - Dispose of contents/ container to an approved waste disposal plant
P273 - Avoid release to the environment
P234 - Keep only in original container
P390 - Absorb spillage to prevent material damage

Other Hazards Known
May be harmful if swallowed
Harmful to aquatic life

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Not applicable

Mixture

Percent ranges are used where confidential product information is applicable.

4. FIRST AID MEASURES

Description of first aid measures

General advice — Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Inhalation — Remove to fresh air. If breathing has stopped, give artificial respiration. Get medical attention immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. Delayed pulmonary edema may occur. Get immediate medical advice/attention.

Eye contact — Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open

while rinsing. Do not rub affected area. Get immediate medical advice/attention.

Skin contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get immediate medical advice/attention.

Ingestion Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Get immediate medical advice/attention.

Self-protection of the first aider Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation.

Indication of any immediate medical attention and special treatment needed

Note to physicians Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous combustion products May emit toxic and corrosive fumes.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Attention! Corrosive material. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Handle product only in closed system or provide appropriate exhaust ventilation. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture. Store locked up. Keep out of the reach of children. Store away from other materials.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves. Impervious gloves.

Eye/face protection Face protection shield.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing. Chemical resistant apron.

General Hygiene Considerations Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Regular cleaning of equipment, work area and clothing is recommended. Avoid contact with skin, eyes or clothing. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Contaminated work clothing should not be allowed out

of the workplace. Wash hands before breaks and immediately after handling the product.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid
Appearance powder
Color white
Odor Chlorine
Odor threshold No data available

Property	Values	Remarks • Method
Molecular weight	No data available	
pH	12.33	5% Solution
Melting point/freezing point	> 240 °C / 464 °F	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	0.375 mm Hg / 0.05 kPa at 20 °C / 68 °F	Estimation based on theoretical calculation
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	1.783	
Partition Coefficient (n-octanol/water)	Not applicable	
Soil Organic Carbon-Water Partition Coefficient	Not applicable	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	No data available	25 °C / 77 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other Information

Metal Corrosivity

Classified as corrosive to metal according to GHS criteria

Steel Corrosion Rate	0 mm/yr / 0 in/yr
Aluminum Corrosion Rate	20.4 mm/yr / 0.8 in/yr

Volatile Organic Compounds (VOC) Content
Not applicable

Explosive properties

Upper explosion limit	No data available
Lower explosion limit	No data available

Flammable properties

Flash point	Not applicable

Flammability Limit in Air

Upper flammability limit	No data available
Lower flammability limit	No data available

Oxidizing properties	No data available.
Bulk density	No data available
Particle Size	No information available
Particle Size Distribution	No information available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stability Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions
Possibility of Hazardous Reactions None under normal processing.

Hazardous polymerization
None under normal processing.

Conditions to avoid
Conditions to avoid Exposure to air or moisture over prolonged periods.

Incompatible materials
Incompatible materials Oxidizing agent. Acids. Bases.

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating and toxic gases and vapors.

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
Product Information

Inhalation Corrosive by inhalation. Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs. Pulmonary edema can be fatal.

Eye contact Causes burns. Corrosive to the eyes and may cause severe damage including blindness. Causes serious eye damage. May cause irreversible damage to eyes.

Skin contact May cause irritation.

Ingestion Causes burns. Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways.

Symptoms Redness. Burning. May cause blindness. Coughing and/ or wheezing.

Aggravated Medical Conditions Eye disorders. Skin disorders. Respiratory disorders.
Toxicologically synergistic products None known.
Toxicokinetics, metabolism and distribution See ingredients information below.

Product Acute Toxicity Data Test data reported below
Oral Exposure Route

Endpoint type	Reported dose	Key literature references and sources for data
Rat LD_{50}	3613 mg/kg	Outside testing

Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	No information available
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	26.63 mg/L
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Ingredient Acute Toxicity Data
Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Specific Target Organ Toxicity Single Exposure Data
Oral Exposure Route
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available

Inhalation (Gas) Exposure Route No data available

Ingredient Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route	If available, see data below
Dermal Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

Aspiration toxicity
If available, see data below
Kinematic viscosity Not applicable

Product Skin Corrosion/Irritation Data
No data available.

Ingredient Skin Corrosion/Irritation Data
If available, see data below

Product Serious Eye Damage/Eye Irritation Data
No data available.

Ingredient Eye Damage/Eye Irritation Data
If available, see data below

Sensitization Information

Product Sensitization Data

Skin Sensitization Exposure Route	No data available.
Respiratory Sensitization Exposure Route	No data available.

Ingredient Sensitization Data

Skin Sensitization Exposure Route	If available, see data below.
Respiratory Sensitization Exposure Route	If available, see data below.

Chronic Toxicity Information

Product Specific Target Organ Toxicity Repeat Dose Data

Oral Exposure Route	No data available.
Dermal Exposure Route	No data available.
Inhalation (Dust/Mist) Exposure Route	No data available.
Inhalation (Vapor) Exposure Route	No data available.
Inhalation (Gas) Exposure Route	No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Oral Exposure Route	If available, see data below
Dermal Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

Product Carcinogenicity Data

Oral Exposure Route	No data available
Dermal Exposure Route	No data available
Inhalation (Dust/Mist) Exposure Route	No data available
Inhalation (Vapor) Exposure Route	No data available
Inhalation (Gas) Exposure Route	No data available

Ingredient Carcinogenicity Data

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Germ Cell Mutagenicity *invitro* **Data**
No data available.

Ingredient Germ Cell Mutagenicity *invitro* **Data**
If available, see data below

Product Germ Cell Mutagenicity *invivo* **Data**
Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Germ Cell Mutagenicity *invivo* **Data**
Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Reproductive Toxicity Data
Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Reproductive Toxicity Data
Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

12. ECOLOGICAL INFORMATION

Ecotoxicity Harmful to aquatic life with long lasting effects

Product Ecological Data

Aquatic toxicity

Fish No data available
Crustacea No data available
Algae No data available

Ingredient Ecological Data

Aquatic toxicity

Fish If available, see ingredient data below
Crustacea If available, see ingredient data below
Algae If available, see ingredient data below

Other Information

Persistence and degradability

Product Biodegradability Data
No data available.

Ingredient Biodegradability Data

Chemical name	Test method	Biodegradation	Exposure time	Results
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	None reported	73%	14 days	Readily biodegradable
Dichloroisocyanuric acid, sodium salt (1 - 5%) CAS#: 2893-78-9	Estimation through BIOWIN v4.10 part of the Estimation Programs Interface (EPI) Suite™	None reported	None reported	Not readily biodegradable

Bioaccumulation

Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) Not applicable

Ingredient Bioaccumulation Data

Mobility

Soil Organic Carbon-Water Partition Coefficient Not applicable

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	No data available	25 °C / 77 °F

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

US EPA Waste Number D002

Special instructions for disposal Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Open cold water tap completely, slowly pour the reacted material to the drain. Flush system with plenty of water.

14. TRANSPORT INFORMATION

U.S. DOT

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Description	UN2680, Lithium hydroxide, 8, II
Emergency Response Guide Number	154

TDG

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
Description	UN2680, Lithium hydroxide, 8, II

IATA

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
ERG Code	8L
Description	UN2680, Lithium hydroxide, 8, II

IMDG

UN/ID no	UN2680
Proper shipping name	Lithium hydroxide
Hazard Class	8
Packing Group	II
EmS-No	F-A, S-B
Description	UN2680, Lithium hydroxide (Dichloroisocyanuric acid, sodium salt), 8, II, Marine Pollutant

Note: No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods.
If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies

ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

U.S. EPA Label Information

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)

NFPA and HMIS Classifications

NFPA	**Health hazards** - 3	**Flammability** - 0	**Instability** - 0	**Physical and Chemical Properties** -
HMIS	**Health hazards** - 3	**Flammability** - 0	**Physical Hazards** - 0	**Personal protection** - X - See section 8 for more information

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	*Immediately Dangerous to Life or Health*
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	*no data*

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By	Hach Product Compliance Department
Issue Date	17-04-2018
Revision Date	24-Aug-2018
Revision Note	SDS sections updated 2

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2018

End of Safety Data Sheet

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name DPD Total Chlorine Reagent

Other means of identification
Product Code(s) 2105669

Safety data sheet number M00110

HMRIC # HMIRA Registry Number 9936 Filed 2016-04-11

Recommended use of the chemical and restrictions on use
Recommended Use Laboratory reagent. Indicator for total chlorine.
Uses advised against None.
Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service +1(515)232-2533 - 8am - 4pm CST

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word - Warning

Hazard statements

H315 - Causes skin irritation
H319 - Causes serious eye irritation

Precautionary statements
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P332 + P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash before reuse
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/attention

Other Hazards Known
May be harmful if swallowed

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Not applicable

Mixture

Chemical Family Mixture.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Sodium phosphate dibasic	7558-79-4	20 - 30%	-
Potassium iodide (KI)	7681-11-0	20 - 30%	-
Salt of N,N-Diethyl-p-Phenylenediamine	-	1 - 5%	-
Glycine, N,N-1,2-ethanediylbis[N-(carboxymethyl)-, disodium salt, dihydrate	6381-92-6	<1%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists. Do not rub affected area.

Skin contact Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.

Ingestion Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician.

Self-protection of the first aider Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical No information available.

Hazardous combustion products Carbon monoxide, Carbon dioxide. Iodine compounds. Phosphorus oxides. Potassium oxides. Sodium monoxide. Nitrogen oxides.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Potassium iodide (KI) CAS#: 7681-11-0	TWA: 0.01 ppm	NDF	NDF

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves. Impervious gloves.

Eye/face protection If splashes are likely to occur, wear safety glasses with side-shields.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing.

General Hygiene Considerations Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid
Appearance powder
Color White to light pink
Odor Odorless
Odor threshold No data available

Property	Values	Remarks • Method
Molecular weight	No data available	
pH	No data available	
Melting point/freezing point	145 °C / 293 °F	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	1.79	
Partition Coefficient (n-octanol/water)	log K_{ow} ~ 0	
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ 0	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
None reported	No information available	No data available	No information available

Other Information

Metal Corrosivity

Steel Corrosion Rate 0.97 mm/yr / 0.04 in/yr
Aluminum Corrosion Rate 0.15 mm/yr / 0.01 in/yr

Volatile Organic Compounds (VOC) Content
Not applicable

Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Sodium phosphate dibasic	7558-79-4	No data available	-
Potassium iodide (KI)	7681-11-0	Not applicable	-
Salt of N,N-Diethyl-p-Phenylenediamine	-	Not applicable	-
Glycine, N,N-1,2-ethanediylbis[N-(carboxymethyl)-, disodium salt, dihydrate	6381-92-6	Not applicable	-

Explosive properties

Upper explosion limit No data available
Lower explosion limit No data available

Flammable properties

Flash point Not applicable

Flammability Limit in Air
Upper flammability limit: No data available
Lower flammability limit: No data available

Oxidizing properties No data available.

Bulk density No data available

Particle Size No information available

Particle Size Distribution No information available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stability Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions
Possibility of Hazardous Reactions None under normal processing.

Hazardous polymerization
None under normal processing.

Conditions to avoid
Conditions to avoid None known based on information supplied.

Incompatible materials
Incompatible materials Strong acids. Strong bases. Strong oxidizing agents.

Hazardous Decomposition Products
Carbon dioxide. Carbon monoxide. Iodine compounds. Phosphorus oxides. Potassium oxide. Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
Product Information

Inhalation	May cause irritation of respiratory tract.
Eye contact	Irritating to eyes. Causes serious eye irritation.
Skin contact	Causes skin irritation.
Ingestion	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Symptoms	Redness. May cause redness and tearing of the eyes.
Aggravated Medical Conditions	Skin disorders. Eye disorders.
Toxicologically synergistic products	None known.
Toxicokinetics, metabolism and distribution	See ingredients information below.

Chemical name	Toxicokinetics, metabolism and distribution
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Phosphates are widely utilized by cells for metabolism of proteins, fats and carbohydrates.
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	May cross placenta and be excreted in breast milk. May react synergistically with mercury.
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	EDTA and related compounds are poorly absorbed by the digestive system.

Product Acute Toxicity Data Test data reported below
Oral Exposure Route

Endpoint type	Reported dose	Toxicological effects	Key literature references and sources for data
Rat LD_{50}	4700 mg/kg	**Behavioral** Flaccid muscle tone Lethargy Prostration **Eye** Chromodacryorrhea Ptosis **Gastrointestinal** Abnormalities of the gastrointestinal tract Diarrhea **Liver** Abnormalities of the liver **Lungs, Thorax, or Respiration** Abnormalities of the lungs Dyspnea Red or brown staining of the nose/mouth area **Nutritional and Gross Metabolic** Soiling of the anogenital area Wetness of the anogenital area **Reproductive** **Skin and Appendages** Piloerection	Outside testing

Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

ATEmix (oral)	No information available
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Ingredient Acute Toxicity Data
Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%)	Rat LD_{50}	2779 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of

CAS#: 7681-11-0					Chemical Substances)
Salt of N,N-Diethyl-p-Phenylenediamine (1 - 5%) CAS#: -	Rat LD_{50}	695 mg/kg	None reported	None reported	Outside testing
Glycine, N,N-1,2-ethanediylbis[N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Rat LD_{50}	2300 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Rat LD_{50}	17000 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Mouse LD_{50}	1000 mg/kg	None reported	None reported	Vendor SDS

Dermal Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Rat LD_{50}	> 2000 mg/kg	None reported	None reported	ECHA (The European Chemicals Agency)

Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Mouse LD_{Lo}	1862 mg/kg	None reported	**Lungs, Thorax, or Respiration** Dyspnea	RTECS (Registry of Toxic Effects of Chemical Substances)

Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Aspiration toxicity
If available, see data below
Kinematic viscosity Not applicable

Product Skin Corrosion/Irritation Data
No data available.

Ingredient Skin Corrosion/Irritation Data
If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Standard Draize Test	Rabbit	500 mg	24 hours	Skin irritant	RTECS (Registry of Toxic Effects of Chemical Substances)
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Standard Draize Test	Rabbit	None reported	None reported	Skin irritant	Vendor SDS
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Standard Draize Test	Rabbit	500 mg	20 hours	Not corrosive or irritating to skin	ECHA (The European Chemicals Agency)

Product Serious Eye Damage/Eye Irritation Data
No data available.

Ingredient Eye Damage/Eye Irritation Data
If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Standard Draize Test	Rabbit	500 mg	24 hours	Eye irritant	RTECS (Registry of Toxic Effects of Chemical Substances)
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Standard Draize Test	Rabbit	None reported	24 hours	Eye irritant	Vendor SDS
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Standard Draize Test	Rabbit	50 mg	None reported	Mild eye irritant	ECHA (The European Chemicals Agency)

Sensitization Information

Product Sensitization Data
Skin Sensitization Exposure Route No data available.
Respiratory Sensitization Exposure Route No data available.

Ingredient Sensitization Data
Skin Sensitization Exposure Route If available, see data below.

Chemical name	Test method	Species	Results	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Patch test	Human	Not confirmed to be a skin sensitizer	ERMA (New Zealands Environmental Risk Management Authority)

Respiratory Sensitization Exposure Route If available, see data below.

Chronic Toxicity Information

Product Specific Target Organ Toxicity Repeat Dose Data
Oral Exposure Route No data available.

Dermal Exposure Route No data available.
Inhalation (Dust/Mist) Exposure Route No data available.
Inhalation (Vapor) Exposure Route No data available.
Inhalation (Gas) Exposure Route No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Rat NOAEL	0.5 mg/kg	90 days	None reported	ECHA (The European Chemicals Agency)

Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Carcinogenicity Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Carcinogenicity Data

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Sodium phosphate dibasic	7558-79-4	-	-	-	-
Potassium iodide (KI)	7681-11-0	-	-	-	-
Salt of N,N-Diethyl-p-Phenylenediamine	-	-	-	-	-
Glycine, N,N-1,2-ethanediylbis[N-(carboxymethyl)-, disodium salt, dihydrate	6381-92-6	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Germ Cell Mutagenicity *invitro* **Data**
No data available.

Ingredient Germ Cell Mutagenicity *invitro* **Data**
If available, see data below

Chemical name	Test	Cell Strain	Reported dose	Exposure time	Results	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%)	Cytogenetic analysis	Rat ascites tumor	500 mg/kg	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of

CAS#: 7681-11-0						Chemical Substances)
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Cytogenetic analysis	Hamster lung	200 mg/L	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of Chemical Substances)

Product Germ Cell Mutagenicity *invivo* **Data**

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Germ Cell Mutagenicity *invivo* **Data**

Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Reproductive Toxicity Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Reproductive Toxicity Data

Oral Exposure Route If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Human TD_{Lo}	2700 mg/kg	39 weeks	**Specific Developmental Abnormalities** Endocrine System	RTECS (Registry of Toxic Effects of Chemical Substances)
Chemical name	**Endpoint type**	**Reported dose**	**Exposure time**	**Toxicological effects**	**Key literature references and sources for data**
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Human TD_{Lo}	3240 mg/kg	39 weeks	**Effects on Newborn** Other neonatal measures or effects Physical **Specific Developmental Abnormalities** Endocrine system	RTECS (Registry of Toxic Effects of Chemical Substances)

Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

12. ECOLOGICAL INFORMATION

Ecotoxicity Not considered to be harmful to aquatic life

Product Ecological Data

Aquatic toxicity

Fish No data available

Crustacea No data available
Algae No data available

Ingredient Ecological Data

Aquatic toxicity

Fish If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	96 hours	*Lepomis macrochirus*	LC_{50}	159 mg/L	Vendor SDS

Crustacea If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Salt of N,N-Diethyl-p-Phenyl enediamine (1 - 5%) CAS#: -	48 Hours	*Daphina magna*	EC_{50}	10.8 mg/L	Internal Data

Algae If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	72 Hours	None reported	EC_{50}	10 mg/L	Vendor SDS

Other Information

Persistence and degradability

Product Biodegradability Data
No data available.

Ingredient Biodegradability Data

Chemical name	Test method	Biodegradation	Exposure time	Results
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Inorganic Salt	None reported	None reported	Not readily biodegradable
Salt of N,N-Diethyl-p-Phenyl enediamine (1 - 5%) CAS#: -	None reported	None reported	None reported	Not determined

Bioaccumulation

Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) log K_{ow} ~ 0

Ingredient Bioaccumulation Data

Chemical name	Test method	Exposure time	Species	Bioconcentration factor (BCF)	Results
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	None reported	None reported	None reported	None reported	Not determined
Salt of N,N-Diethyl-p-Phenylenediamine (1 - 5%) CAS#: -	None reported	None reported	None reported	None reported	Not determined
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	None reported	None reported	None reported	None reported	Not determined

Mobility

Soil Organic Carbon-Water Partition Coefficient log K_{oc} ~ 0

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

14. TRANSPORT INFORMATION

U.S. DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

Note: No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium phosphate dibasic	5000 lb	-	-	X

7558-79-4				

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Sodium phosphate dibasic 7558-79-4	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Sodium phosphate dibasic 7558-79-4	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Sodium phosphate dibasic	180.0910	21 CFR 182.1778,21 CFR 182.6290,21 CFR 182.6778,21 CFR 182.8778
Potassium iodide (KI)	180.0940	21 CFR 184.1634

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)
Not applicable

NFPA and HMIS Classifications

NFPA	**Health hazards** - 2	**Flammability** - 0	**Instability** - 0	**Physical and Chemical Properties** -
HMIS	**Health hazards** - 2	**Flammability** - 0	**Physical Hazards** - 0	**Personal protection** - X - See section 8 for more information

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	*Immediately Dangerous to Life or Health*
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	*no data*

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By	Hach Product Compliance Department
Issue Date	30-04-2018
Revision Date	04-May-2018
Revision Note	None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2018

End of Safety Data Sheet

SAFETY DATA SHEET

Issue Date 07-Oct-2018 **Revision Date** 14-Jan-2019 **Version** 1.3

1. Identification

Product identifier

Product Name Dissolved Oxygen Reagent, High Range

Other means of identification

Product Code(s) 2515025

Recommended use of the chemical and restrictions on use

Recommended Use Determination of dissolved oxygen.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number

Emergency Telephone +1(303) 623-5716 - 24 Hour Service

2. Hazards identification

Classification

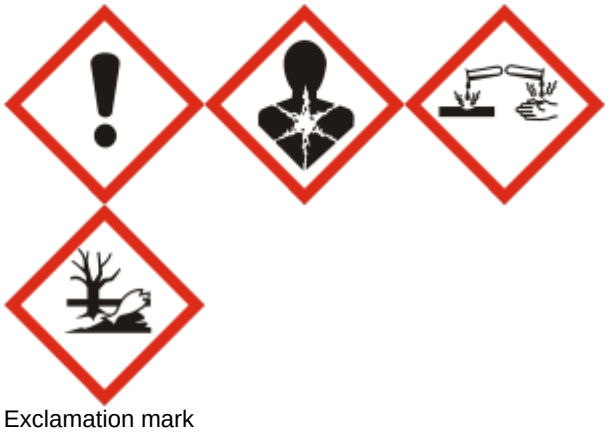
Acute toxicity - Oral	Category 4 - (H302)
Skin corrosion/irritation	Category 3 - (H316)
Serious eye damage/eye irritation	Category 1 - (H318)
Skin sensitization	Category 1 - (H317)
Germ cell mutagenicity	Category 2 - (H341)
Carcinogenicity	Category 2 - (H351)
Reproductive toxicity	Category 2 - (H361)
Specific target organ toxicity (repeated exposure)	Category 2 - (H373)
Acute aquatic toxicity	Category 1 - (H400)

Label elements

Signal word - Danger

Hazard statements
H302 - Harmful if swallowed
H316 - Causes mild skin irritation
H317 - May cause an allergic skin reaction
H318 - Causes serious eye damage
H341 - Suspected of causing genetic defects

H351 - Suspected of causing cancer
H361 - Suspected of damaging fertility or the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure
H400 - Very toxic to aquatic life



Exclamation mark
Health hazard
Corrosion
Environment

Precautionary statements
P270 - Do not eat, drink or smoke when using this product
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P330 - Rinse mouth
P501 - Dispose of contents/ container to an approved waste disposal plant
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor
P272 - Contaminated work clothing should not be allowed out of the workplace
P302 + P352 - IF ON SKIN: Wash with plenty of water and soap
P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention
P362 + P364 - Take off contaminated clothing and wash it before reuse
P201 - Obtain special instructions before use
P308 + P313 - IF exposed or concerned: Get medical advice/attention
P405 - Store locked up
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P273 - Avoid release to the environment
P391 - Collect spillage

Other Hazards Known
Not applicable

3. Composition/information on ingredients

Substance

Not applicable.

Mixture

Chemical name	CAS No.	Synonyms	Percent Range
Tetrasodium EDTA	**64-02-8**	**Tetrasodium EDTA Tetrasodium ethylenediaminetetraacetate**	**40 - 50%**
1,4-Benzenediol	**123-31-9**	**No information available**	**1 - 5%**

Poly(oxy-1,2-ethanediyl), .alpha.-(dinonylphenyl)-.omega.-hydroxy-	**9014-93-1**	**No information available**	**1 - 5%**

4. First aid measures

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance. IF exposed or concerned: Get medical advice/attention.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Eye contact Get immediate medical advice/attention. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area.

Skin contact Wash off immediately with soap and plenty of water for at least 15 minutes. May cause an allergic skin reaction. In the case of skin irritation or allergic reactions see a physician.

Ingestion Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Call a physician.

Self-protection of the first aider Avoid contact with skin, eyes or clothing. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation. Itching. Rashes. Hives. Prolonged contact may cause redness and irritation.

Indication of any immediate medical attention and special treatment needed

Note to physicians May cause sensitization in susceptible persons. Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical Product is or contains a sensitizer. May cause sensitization by skin contact.

Hazardous combustion products Nitrogen oxides. Carbon monoxide, Carbon dioxide.

Explosion data
Sensitivity to mechanical impact None.
Sensitivity to static discharge None.

Special protective actions for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions	Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
Other information	Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions	Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up

Methods for containment	Prevent further leakage or spillage if safe to do so.
Methods for cleaning up	Pick up and transfer to properly labeled containers.
Prevention of secondary hazards	Clean contaminated objects and areas thoroughly observing environmental regulations.

7. Handling and storage

Precautions for safe handling

Advice on safe handling	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Take off contaminated clothing and wash before reuse. Remove contaminated clothing and shoes.

Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Store locked up.

8. Exposure controls/personal protection

Control parameters

Exposure Limits	This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Appropriate engineering controls

Engineering controls	Showers Eyewash stations Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection	Tight sealing safety goggles.
Hand protection	Wear suitable gloves.
Skin and body protection	Wear suitable protective clothing.
Respiratory protection	No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state	Solid		
Appearance	powder	**Color**	white
Odor	Irritating	**Odor threshold**	No data available

Property	Values	Remarks • Method
Molecular weight	No data available	
pH	10.3	5% Solution
Melting point/freezing point	65 °C / 149 °F	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	1.45	
Partition Coefficient (n-octanol/water)	log K_{ow} ~ 0.67	
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ 0	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Acid	Slightly soluble	> 0.1 mg/L	25 °C / 77 °F

Other Information

Metal Corrosivity

Steel Corrosion Rate	1.42 mm/yr / 0.06 in/yr
Aluminum Corrosion Rate	4.57 mm/yr / 0.18 in/yr

Volatile Organic Compounds (VOC) Content
Not applicable

Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Tetrasodium EDTA	64-02-8	No data available	-
1,4-Benzenediol	123-31-9	No data available	X
Poly(oxy-1,2-ethanediyl), .alpha.-(dinonylphenyl)-.omega.-hydroxy-	9014-93-1	No data available	-

Explosive properties

Upper explosion limit No data available
Lower explosion limit No data available

Flammable properties

Flash point Not applicable

Flammability Limit in Air
Upper flammability limit No data available
Lower flammability limit No data available

Oxidizing properties No data available.

Bulk density No data available

10. Stability and reactivity

Reactivity No information available.

Chemical stability Stable under normal conditions.

Possibility of Hazardous Reactions None under normal processing.

Conditions to avoid None known based on information supplied.

Incompatible materials Strong acids. Strong bases. Strong oxidizing agents.

Hazardous Decomposition Products Nitrogen oxides. Carbon dioxide. Carbon monoxide.

11. Toxicological information

Information on Likely Routes of Exposure

Product Information

Inhalation No known effect based on information supplied.

Eye contact Severely irritating to eyes. Causes serious eye damage. May cause burns. May cause irreversible damage to eyes.

Skin contact May cause irritation. May cause sensitization by skin contact. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. Causes mild skin irritation.

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Harmful if swallowed.

Symptoms Redness. Burning. May cause blindness. Itching. Rashes. Hives. Prolonged contact may cause redness and irritation.

Acute toxicity
Based on available data, the classification criteria are not met

Product Acute Toxicity Data
No data available.

Ingredient Acute Toxicity Data
Test data reported below.

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Tetrasodium EDTA (40 - 50%) CAS#: 64-02-8	Rat LD_{50}	1658 mg/kg	None reported	None reported	ERMA (New Zealands Environmental Risk Management Authority)
1,4-Benzenediol (1 - 5%) CAS#: 123-31-9	Rat LD_{50}	302 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)
Chemical name	**Endpoint type**	**Reported dose**	**Exposure time**	**Toxicological effects**	**Key literature references and sources for data**
1,4-Benzenediol (1 - 5%) CAS#: 123-31-9	Rat LD_{50}	5970 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)

Unknown acute toxicity
0 % of the mixture consists of ingredient(s) of unknown toxicity.

0 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
0 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
0 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)
0 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)
0 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	1,329.00
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Skin corrosion/irritation
May cause skin irritation.

Product Skin Corrosion/Irritation Data
No data available.

Ingredient Skin Corrosion/Irritation Data
No data available.

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Poly(oxy-1,2-ethanediyl),	None reported	None reported	None reported	None reported	Skin irritant	No information available

.alpha.-(dinonylphenyl)-.omega.-hydroxy- (1 - 5%) CAS#: 9014-93-1						

Serious eye damage/eye irritation
Classification based on data available for ingredients. Causes burns. Risk of serious damage to eyes.

Product Serious Eye Damage/Eye Irritation Data
No data available.

Ingredient Eye Damage/Eye Irritation Data
No data available.

Respiratory or skin sensitization
May cause sensitization by skin contact.

Product Sensitization Data
No data available.

Ingredient Sensitization Data
No data available.

STOT - single exposure
Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Single Exposure Data
No data available.

Ingredient Specific Target Organ Toxicity Single Exposure Data
No data available.

STOT - repeated exposure
May cause damage to organs.

Product Specific Target Organ Toxicity Repeat Dose Data
No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data
No data available.

Carcinogenicity
Classification based on data available for ingredients. Contains a known or suspected carcinogen.

Product Carcinogenicity Data
No data available.

Ingredient Carcinogenicity Data
No data available.

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Tetrasodium EDTA	64-02-8	-	-	-	-
1,4-Benzenediol	123-31-9	A3	Group 3	-	-
Poly(oxy-1,2-ethanediyl), .alpha.-(dinonylphenyl)-.omega.-hydroxy-	9014-93-1	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	A3 - Animal Carcinogen
IARC (International Agency for Research on Cancer)	Group 3 - Not classifiable as a human carcinogen
NTP (National Toxicology Program)	Does not apply

OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Germ cell mutagenicity
Based on available data, the classification criteria are not met.

Product Germ Cell Mutagenicity *invitro* **Data**
No data available.

Ingredient Germ Cell Mutagenicity *invitro* **Data**
No data available.

Chemical name	Test	Cell Strain	Reported dose	Exposure time	Results	Key literature references and sources for data
1,4-Benzenediol (1 - 5%) CAS#: 123-31-9	Micronucleus test	Human lymphocyte	0.075 mmol/L	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of Chemical Substances)

Product Germ Cell Mutagenicity *invivo* **Data**
No data available.

Ingredient Germ Cell Mutagenicity *invivo* **Data**
No data available.

Reproductive toxicity
Classification based on data available for ingredients. Contains a known or suspected reproductive toxin. The table below indicates ingredients above the cut-off threshold considered as relevant which are listed as reproductive toxins.

Product Reproductive Toxicity Data
No data available.

Ingredient Reproductive Toxicity Data
No data available.

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
1,4-Benzenediol (1 - 5%) CAS#: 123-31-9	Rat TD_{Lo}	2500 mg/kg	22 days	**Effects on Fertility** Post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)	RTECS (Registry of Toxic Effects of Chemical Substances)

Aspiration hazard
Based on available data, the classification criteria are not met.

12. Ecological information

Ecotoxicity Very toxic to aquatic life.

Unknown aquatic toxicity 0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Product Ecological Data

Aquatic Acute Toxicity
No data available.

Aquatic Chronic Toxicity
No data available.

Ingredient Ecological Data

Aquatic Acute Toxicity

No data available.

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
1,4-Benzenediol (1 - 5%) CAS#: 123-31-9	96 hours	None reported	LC_{50}	0.044 mg/L	GESTIS (Information System on Hazardous Substances of the German Social Accident Insurance)
Chemical name	**Exposure time**	**Species**	**Endpoint type**	**Reported dose**	**Key literature references and sources for data**
1,4-Benzenediol (1 - 5%) CAS#: 123-31-9	48 Hours	None reported	EC_{50}	0.13 mg/L	GESTIS (Information System on Hazardous Substances of the German Social Accident Insurance)

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Product Biodegradability Data
No data available.

Bioaccumulation

Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) $\log K_{ow} \sim 0.67$

Mobility

Soil Organic Carbon-Water Partition Coefficient $\log K_{oc} \sim 0$

Other adverse effects
Contains a substance with an endocrine-disrupting potential.

13. Disposal considerations

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

14. Transportation information

MEX Not regulated

Note: No special precautions necessary.

TDG
- **UN/ID no** UN3077
- **Proper shipping name** Environmentally hazardous substances, solid, n.o.s.
- **Hazard Class** 9
- **Packing Group** III

U.S. DOT
- **UN/ID no** UN3077

Proper shipping name	Environmentally hazardous substances, solid, n.o.s.
Hazard Class	9
Packing Group	III

ICAO (air) Not regulated

IATA

UN/ID no	UN3077
Hazard Class	9
Packing Group	III

IMDG

UN/ID no	UN3077
Hazard Class	9
Packing Group	III
Marine pollutant	This material meets the definition of a marine pollutant

RID Not regulated

ADR

UN/ID no	UN3077
Proper shipping name	Environmentally hazardous substances, solid, n.o.s.
Hazard Class	9
Packing Group	III

ADN Not regulated

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

International Inventories

TSCA	Complies.
DSL/NDSL	Complies.
EINECS/ELINCS	Complies.
ENCS	Complies.
IECSC	Complies.
KECL	Complies.
PICCS	Complies.
AICS	Complies.

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

16. Other information

NFPA	**Health hazards**	3	**Flammability**	0	**Instability**	0	**Physical and chemical properties** -
HMIS	**Health hazards**	3 *	**Flammability**	0	**Physical hazards**	0	**Personal protection** X

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	SKN*	Skin designation

Key literature references and sources for data used to compile the SDS
Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
RTECS (Registry of Toxic Effects of Chemical Substances)
World Health Organization

Prepared By Hach Product Compliance Department.

Issue Date 07-Oct-2018

Revision Date 14-Jan-2019

Revision Note None

NOM-018-STPS-2015

The information is believed to be accurate, but it is not exhaustive and must be used only as guidance. It is based on the current state of knowledge of the chemical substance or mixture and is applicable to the appropriate safety precautions for the product.

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2018

End of Safety Data Sheet

Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R1501

Version No.: 2.4

Product Name: Ammonia CHEMets® & VACUettes® Refills and Ammonia Vacu-vials® Ampoules

Part Nos.: R-1501, R-1501A, R-1501B, R-1501C, R-1501D, K-1503 Ampoules, K-1523 Ampoules

Product Descriptions:

CHEMets Refills: Sealed glass ampoules, 7 mm OD, for visual colorimetric water analysis. Each CHEMet™ ampoule contains approximately 0.5 mL of liquid reagent sealed under vacuum. Refills contain 30 ampoules, test kits contain 1 refill.

VACUettes Refills: Sealed glass ampoules, 7 mm OD, with small glass capillary attached, for visual colorimetric water analysis. Each VACUette™ ampoule contains approximately 0.5 mL of liquid reagent sealed under vacuum. Refills contain 30 ampoules, test kits contain 1 refill.

Vacu-vials Ampoules: Sealed glass ampoules, 13 mm OD, for instrumental colorimetric water analysis. Each K-1503 Vacu-vial™ ampoule contains approximately 2 mL of liquid reagent sealed under vacuum. Each K-1523 Vacu-vial™ ampoule contains approximately 4.5 mL of liquid reagent sealed under vacuum. Test kits contain 30 ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

CHEMets®, VACUettes®, Vacu-vials®, and Titrets® are registered trademarks of CHEMetrics Inc.

4295 Catlett Road, Midland, VA 22728 ▪ P: 800.356.3072 ▪ F: 540.788.4856 ▪ www.chemetrics.com

Ammonia CHEMets & VACUettes Refills and Ammonia Vacu-vials Ampoules

CHEMetrics, Inc.

Chemwatch: **9-89020**
SDS No: **R1501**
Version Num: **2.4**

Code d'alerte du risque: **4**

Date de revision: **08/10/2014**
Date d'impression: **13/03/2015**
date initiale: **10/10/2014**
S.GHS.CAN.FR

SECTION 1 IDENTIFICATION DE LA SUBSTANCE/DU MÉLANGE ET DE LA SOCIÉTÉ/L'ENTREPRISE

Identificateur de produit

Nom du produit	Ammonia CHEMets & VACUettes Refills and Ammonia Vacu-vials Ampoules
Synonymes	Part Nos.: R-1501, R-1501A, R-1501B, R-1501C, R-1501D, K-1503 Ampoules, K-1523 Ampoules
Nom d'expédition	LIQUIDE CORROSIF, NSA (contains sodium hydroxide and mercuric iodide)
Formule chimique	Sans Objet
Autres moyens d'identification	Pas Disponible
Numéro CAS	Sans Objet

Utilisations identifiées pertinentes de la substance ou du mélange et utilisations déconseillées

Utilisations identifiées pertinentes :	Component of water analysis test kits K-1503, K-1510, K-1510A, K-1510B, K-1510C, K-1510D, K-1523

Renseignements concernant le fournisseur de la fiche de données de sécurité

Nom commercial de l'entreprise	CHEMetrics, Inc.
Adresse	4295 Catlett Road, Midland, VA. 22728 United States
Téléphone	1-540-788-9026
Fax	1-540-788-4856
Site Internet	www.chemetrics.com
Courriel	technical@chemetrics.com

Numéro d'appel d'urgence

Association / Organisation	ChemTel Inc.
Numéro de téléphone d'appel d'urgence	1-800-255-3924
Autres numéros de téléphone d'urgence	+01-813-248-0585

SECTION 2 IDENTIFICATION DES DANGERS

Classification de la substance ou du mélange

Continued...

Classification de SGH	Corrosion de métal catégorie 1, TOXICITÉ AIGUË PAR VOIE ORALE Catégorie 2, TOXICITÉ AIGUË PAR VOIE CUTANÉE Catégorie 1, TOXICITÉ AIGUË PAR INHALATION Catégorie 1, Irritation/corrosion cutanée catégorie 1A, Dommage occulaire important catégorie 1, SENSIBILISATION RESPIRATOIRE Catégorie 1, SENSIBILISATION CUTANÉE Catégorie 1, STOT - SE (. Resp. IRR) Catégorie 3, TOXICITÉ SYSTÉMIQUE POUR CERTAINS ORGANES CIBLES Catégorie 2, TOXICITÉ (CHRONIQUE) POUR LE MILIEU AQUATIQUE Catégorie 3

Éléments d'étiquetage

Éléments pour étiquette GHS	
MENTION D'AVERTISSEMENT	**DANGER**

Déclaration(s) sur les risques

H290	Peut être corrosif pour les métaux.
H300	Mortel en cas d'ingestion.
H310	Mortel par contact cutané.
H330	Mortel par inhalation.
H314	Provoque des brûlures de la peau et des lésions oculaires graves.
H318	Provoque des lésions oculaires graves.
H334	Peut provoquer des symptômes allergiques ou d'asthme ou des difficultés respiratoires par inhalation.
H317	Peut provoquer une allergie cutanée.
H335	Peut irriter les voies respiratoires.
H373	Risque présumé d'effets graves pour les organes à la suite d'expositions répétées ou d'une exposition prolongée
H412	Nocif pour les organismes aquatiques, entraîne des effets néfastes à long terme.

Déclarations de Sécurité: Prévention

P101	En cas de consultation d'un médecin, garder à disposition le récipient ou l'étiquette.
P102	Tenir hors de portée des enfants.
P103	Lire l'étiquette avant utilisation.
P260	Ne pas respirer les poussières/fumées/gaz/brouillards/vapeurs/aérosols.
P262	Éviter tout contact avec les yeux, la peau ou les vêtements.
P270	Ne pas manger, boire ou fumer en manipulant ce produit.
P271	Utiliser seulement en plein air ou dans un endroit bien ventilé.
P280	Porter des gants de protection/des vêtements de protection/un équipement de protection des yeux/du visage.

Déclarations de Sécurité: Réponse

P301+P310	EN CAS D'INGESTION: appeler immédiatement un CENTRE ANTIPOISON / un médecin / médecin / secouriste premier
P301+P330+P331	EN CAS D'INGESTION: Rincer la bouche. NE PAS faire vomir.
P303+P361+P353	EN CAS DE CONTACT AVEC LA PEAU (ou les cheveux): Enlever immédiatement tous les vêtements contaminés. Rincer la peau à l'eau/Se doucher.
P304+P340	EN CAS D'INHALATION: transporter la personne à l'extérieur et la maintenir dans une position où elle peut confortablement respirer.
P305+P351+P338	EN CAS DE CONTACT AVEC LES YEUX: Rincer avec précaution à l'eau pendant plusieurs minutes. Enlever les lentilles de contact si la victime en porte et si elles peuvent être facilement enlevées. Continuer à rincer.

Déclarations de Sécurité: Stockage

P403+P233	Stocker dans un endroit bien ventilé. Maintenir le récipient fermé de manière étanche.
P405	Garder sous clef.

Déclarations de Sécurité: Élimination

P501	Éliminer le contenu / récipient à décharge chimique agréé ou si organique à l'incinération à haute température

SECTION 3 COMPOSITION/INFORMATIONS SUR LES COMPOSANTS

Substances

Voir la section ci-dessous pour la composition des mélanges

Mélanges

Continued...

Numéro CAS	%[poids]	Nom
7732-18-5	92-96	EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ
1310-73-2	1-3	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE
1303-96-4	1-2	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528
7774-29-0	1-2	diiodure-de-mercure
7681-11-0	1	iodure-de-potassium

SECTION 4 PREMIERS SECOURS

Description des premiers secours

Contact des yeux	Si ce produit entre en contact avec les yeux : ▸ Maintenir immédiatement les yeux ouverts et laver de manière continue pendant au moins 15 minutes avec de l'eau claire. ▸ S'assurer de la complète irrigation des yeux en conservant les paupières ouvertes et loin des yeux et en bougeant les paupières en soulevant occasionnellement les paupières hautes et basses. ▸ Transporter sans délai à l'hôpital ou chez un docteur. ▸ Des lentilles de contact ne doivent être retirées que par une personne formée.
Contact avec la peau	Si ce produit entre en contact avec la peau: ▸ Laver abondamment le corps et les vêtements avec de grandes quantités d'eau, utilisant une douche de protection si possible. ▸ Retirer rapidement les vêtements contaminés, chaussures incluses. ▸ Laver les zones affectées avec de l'eau (et du savon si disponible) pendant au moins 15 minutes. ▸ Transporter à l'hôpital ou chez un docteur.
Inhalation	▸ Si des fumées ou des produits de combustion sont inhalés : Déplacer à l'air frais. ▸ Coucher le patient sur le sol. Conserver-le au chaud et lui permettre de se reposer. ▸ Les prothèses telles que les fausses dents, qui pourraient bloquer les voies respiratoires, doivent être retirées si possible avant d'entamer les procédures de premiers soins. ▸ Si disponible, administrer de l'oxygène médical par une personne formée. Si la respiration est faible ou est stoppée, s'assurer que les voies respiratoires sont dégagées et entamer une reanimation, de préférence à l'aide d'un appareil respiratoir autonome à demande de valve, un masque avec ballonnet et valve ou un masque de poche comme appris. Réaliser une RCP si nécessaire. ▸ Transporter sans délai à l'hôpital ou chez un docteur. Une inhalation de vapeur ou aérosols (fumées) peut provoquer un œdème pulmonaire. Les substances corrosives peuvent causer un dommage au poumon (e.g. œdème pulmonaire, fluide dans les poumons). Comme cette réaction peut être retardée jusqu'à 25 heures après l'exposition, les individus exposés nécessitent un repos complet (de préférence dans une position semi-allongée) et doivent être maintenus sous observation médicale même si aucun symptôme ne s'est (encore) manifesté. Précédant une des ces manifestations, l'administration d'un spray contenant un dérivé de dexaméthasone ou de beclométhasone peut être envisagée. Ceci doit absolument être confié à un docteur ou une personne autorisée par lui/elle. (ICSC13719)
Ingestion	▸ Pour conseil, contacter un Centre Anti-Poison ou un docteur. ▸ Un traitement urgent en hôpital est vraisemblablement nécessaire. ▸ NE PAS faire vomir. ▸ Si un vomissement survient, pencher le patient en avant ou placer le sur son côté gauche (si possible la tête en position basse) pour maintenir les voies respiratoires ouvertes et prévenir une aspiration. ▸ Surveiller le patient avec attention. ▸ Ne jamais donner de liquide à une personne présentant des signes d'endormissement ou ayant une conscience réduite, i.e. devenant inconsciente. ▸ Donner de l'eau (ou du lait) pour rincer la bouche, puis fournir du liquide lentement et autant que la victime peut en boire sans gène. ▸ Transporter sans délai à l'hôpital ou chez un docteur.

Indication des éventuels soins médicaux immédiats et traitements particuliers nécessaires

Traiter symptomatiquement.
pour les corrosifs :

TRAITEMENT BASIQUE

- Etablir des voies respiratoires notables avec succion si nécessaire.
- Surveiller les signes d'insuffisance respiratoire et assister la ventilation si nécessaire.
- Administrer de l'oxygène par un masque avec non-retour à de 10 à 15 l/min.
- Surveiller et traiter, quand nécessaire, contre un choc.
- Surveiller et traiter, quand nécessaire, contre un œdème pulmonaire
- Anticiper les crises.
- Si les yeux ont été exposés, laver immédiatement avec de l'eau et continuer à irriguer avec une solution saline normale durant le transport à l'hospital.
- NE PAS utiliser d'émétiques. Quand une ingestion est suspectée, rincer la bouche et donner jusqu'à 200 ml d'eau (5 ml/kg recommandé) pour la dilution quand le patient est capable d'avaler, possède un fort réflexe pharyngé et ne bave pas.
- Les brûlures de la peau doivent être couvertes avec des bandages stériles et secs après la décontamination.
- NE PAS TENTER une neutralisation car une réaction exothermique pourrait survenir.

TRAITEMENT AVANCE

- Envisager une intubation orotrachéale ou nasotrachéale pour un contrôle des voies respiratoires chez un patient inconscient ou chez qui un arrêt respiratoire est apparu.
- Une ventilation à pression positive à l'aide d'un masque avec valve peut s'avérer utile.
- Surveiller et traiter, quand nécessaire, contre l'arythmie.
- Débuter un IV D5W TKO. Si des signes d'hypovolémie sont présents, utiliser une solution lactée Ringers. Une surcharge de fluide peut créer des complications.
- Une thérapie avec drogue doit être envisager pour un œdème pulmonaire.
- Une hypotension avec des signes d'hypovolèmie nécessite une administration précautionneuse de fluides. Une surcharge de fluide peut créer des complications.
- Traiter les crises avec du diazépam.
- Le chlorhydrate de proparacaine doit être utiliser pour aider l'irrigation des yeux.

DEPARTEMENT D'URGENCE

- Des analyses de laboratoires avec hémogramme complet, sérum électrolytique, BUN, créatine, glucose, analyse d'urine, base pour un sérum glutamo-oxaloacétique transaminase (ALT et AST), calcium, phosphore et magnésium, peuvent aider à établir régime du traitement.
- Une pression positive expiratoire (PEEP) - une ventilation assistée peut être nécessaire pour les blessures parenchymale ou les syndromes de détresse respiratoire adultes.
- Une endoscopie doit être envisagée pour évaluer les blessures orales.

Continued...

- Consulter un toxicologiste si nécessaire.

BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 MESURES DE LUTTE CONTRE L'INCENDIE

Moyens d'extinction

	- Eau pulvérisée - Quantités d'arrosage uniquement. - Mousse. - BCF (lorsque le règlement le permet). - Poudre chimique sèche. - Dioxyde de carbone.

Dangers particuliers résultant de la substance ou du mélange

Incompatibilité au feu	Non connu.

Conseils aux pompiers

Lutte Incendie	- Alerter les pompiers et leurs indiquer l'endroit et la nature du risque. - Porter une protection complète du corps avec un appareil respiratoire. - Prévenir par tous les moyens, les éclaboussures d'entrer dans les drains et voies d'eau. - Utiliser les procédures de lutte incendie adaptées aux lieux environnants. - Ne pas approcher des containers suspectés être chauds.
Risque D'Incendie/Explosion	- Non combustible. - Il ne s'agit pas d'un risque de feu majeur mais des récipients peuvent brûler.

SECTION 6 MESURES À PRENDRE EN CAS DE DISPERSION ACCIDENTELLE

Précautions individuelles, équipement de protection et procédures d'urgence

Eclaboussures Mineures	- Nettoyez tout de suite tous les écoulements. - Evitez de respirer les vapeurs et le contact avec la peau et les yeux. - Contrôlez le contact de votre corps en portant un équipement de protection. - Contenez et absorbez le liquide avec du sable, de la terre, du matériel inerte ou de la vermiculite. - Essuyez.
Eclaboussures Majeures	- Vider la zone de son personnel et se déplacer contre le vent. - Alerter les pompiers et leurs indiquer l'endroit et la nature du risque. - Porter une protection complète du corps avec un appareil respiratoire. - Prévenir par tous les moyens les éclaboussures de pénétrer dans les drains et les voies d'eau. - Envisager une évacuation (ou protéger les lieux).

	Le conseil sur l'équipement de protection individuel est contenu dans la rubrique 8 de la FDS..

SECTION 7 MANIPULATION ET STOCKAGE

Précautions à prendre pour une manipulation sans danger

Manipulation Sure	- Eviter tout contact personnel, incluant l'inhalation. - Porter des vêtements de protection en cas de risque d'exposition. - Utiliser une zone bien ventilée. - **ATTENTION:** Pur éviter toute réaction violente, **TOUJOURS** ajouter le produit à l'eau et**JAMAIS**l'eau au produit. - Eviter de fumer, pas de lumière à nu ni de source d'allumage.
Autres Données	- Stockez-le dans son récipient d'origine. - Maintenez les récipients bien scellés. - Stockez-le dans un endroit frais, sec et bien aéré. - Stockez-le loin de matériels incompatibles et de récipients contenant des aliments. - Protégez les récipients des dégâts matériels et vérifiez régulièrement qu'il n'y ait pas de fuite.

Conditions d'un stockage sûr, y compris d'éventuelles incompatibilités

Container adapté	Emballer comme recommandé par le fabricant. Vérifier que tous les containers sont clairement étiquetés et sans fuite. Pour les matériaux à faible viscosité et les solides: - Bidons et jerricanes doivent être du type avec la tête non-amovible. - Dans les cas ou une conserve métallique doit être utilisée comme emballage interne, la conserve doit posséder une fermeture à vis. Pour les matériaux avec une viscosité d'au moins 2680 cSt.
Incompatibilite de Stockage	Eviter les acides forts.

INCOMPATIBILITÉS DU MATÉRIELLE D'EMBALLAGE

Pas Disponible

SECTION 8 CONTRÔLES DE L'EXPOSITION/PROTECTION INDIVIDUELLE

Paramètres de contrôle

VALEURS LIMITES D'EXPOSITION PROFESSIONNELLE (VLEP)

DONNEES SUR LES INGREDIENTS

Source	Composant	Nom du produit	VME	STEL	pic	Notes

Continued...

Canada - Yukon concentrations admissibles pour les substances aéroportées contaminants	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium hydroxide	2 mg/m3 / --- ppm	--- mg/m3 / --- ppm	Pas Disponible	Pas Disponible
Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	Pas Disponible
Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Hydroxide de sodium	Pas Disponible	Pas Disponible	2 mg/m3	Pas Disponible
Canada - Nouvelle-Écosse Limites d'exposition professionnelle	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	TLV Basis: upper respiratory tract, eye & skin irritation
Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	TLV® Basis: URT, eye, & skin irr
Canada - Limites d'exposition professionnelle de l'Alberta	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	Pas Disponible
Canada - Colombie-Britannique Limites D'Exposition Professionnelle	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium hydroxide	Pas Disponible	Pas Disponible	C 2 mg/m3 mg/m3	Pas Disponible
Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)	HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Sodium, hydroxyde de	Pas Disponible	P2 mg/m3	Pas Disponible	RP
Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Borate compounds, inorganic (inhalable fraction++)	2 mg/m3	6 mg/m3	Pas Disponible	Pas Disponible
Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Borates, tétra, sels de sodium - Décahydrate	5 mg/m3	10 mg/m3	Pas Disponible	Pas Disponible
Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Borates, tétra, sels de sodium - Anhydre	1 mg/m3	3 mg/m3	Pas Disponible	Pas Disponible
Canada - Nouvelle-Écosse Limites d'exposition professionnelle	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Sodium tetraborate - Decahydrate	2 mg/m3	6 mg/m3	Pas Disponible	TLV Basis: upper respiratory tract irritation
Canada - Nouvelle-Écosse Limites d'exposition professionnelle	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Sodium tetraborate - Anhydrous	2 mg/m3	6 mg/m3	Pas Disponible	TLV Basis: upper respiratory tract irritation
Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Borate compounds, inorganic	2 mg/m3	6 mg/m3	Pas Disponible	TLV® Basis: URT irr
Canada - Limites d'exposition professionnelle de l'Alberta	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Borates, tetra, sodium salts, Anhydrous / Borates, tetra, sodium salts, Decahydrate / Borates, tetra, sodium salts, Pentahydrate	1 mg/m3	3 ppm	Pas Disponible	Pas Disponible
Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Sodium, tétraborate de (décahydrate) ou Borax	5 mg/m3	Pas Disponible	Pas Disponible	Pas Disponible
Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)	tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Borax / Sodium, tétraborate de (anhydre)	1 mg/m3	Pas Disponible	Pas Disponible	Voir Sodium, tétraborate de (décahydrate)
Canada - Yukon concentrations admissibles pour les substances aéroportées contaminants	diiodure-de-mercure	Mercury (all forms except Alkyl) (as Hg)	0.05 mg/m3 / --- ppm	0.15 mg/m3 / --- ppm	Pas Disponible	Pas Disponible
Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination	diiodure-de-mercure	Mercury, (as Hg): Inorganic forms, including metallic mercury	0.025 mg/m3	0.075 mg/m3	Pas Disponible	Skin
Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail	diiodure-de-mercure	Mercure (tous les composés sauf les composés alkylés) (en Hg)	0,05 mg/m3	0,15 mg/m3	Pas Disponible	Pas Disponible
Canada - Nouvelle-Écosse Limites d'exposition professionnelle	diiodure-de-mercure	Iodides	0.01 ppm	Pas Disponible	Pas Disponible	TLV Basis: Hypothyroidism; upper respiratory tract irritation

Continued...

Canada - Nouvelle-Écosse Limites d'exposition professionnelle	diiodure-de-mercure	Mercury - Inorganic compounds (as Hg)	0.025 mg/m3	Pas Disponible	Pas Disponible	TLV Basis: central nervous system impairment; kidney damage
Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle	diiodure-de-mercure	Mercury, all forms except alkyl, as Hg Elemental and inorganic forms	0.025 mg/m3	Pas Disponible	Pas Disponible	TLV® Basis: CNS impair; kidney dam; BEI
Canada - Limites d'exposition professionnelle de l'Alberta	diiodure-de-mercure	Mercury, as Hg in Inorganic compounds, including metallic mercury	0.025 mg/m3	Pas Disponible	Pas Disponible	Pas Disponible
Canada - Colombie-Britannique Limites D'Exposition Professionnelle	diiodure-de-mercure	Mercury - Inorganic compounds, as Hg	0.025 mg/m3 mg/m3	Pas Disponible	Pas Disponible	Pas Disponible
Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)	diiodure-de-mercure	Mercure , composés inorganiques (exprimée en Hg)	0,025 mg/m3	Pas Disponible	Pas Disponible	Pc
Canada - Nouvelle-Écosse Limites d'exposition professionnelle	iodure-de-potassium	Iodides	0.01 ppm	Pas Disponible	Pas Disponible	TLV Basis: Hypothyroidism; upper respiratory tract irritation
Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle	iodure-de-potassium	Iodine and iodides Iodides	0.01 ppm	Pas Disponible	Pas Disponible	TLV® Basis: Hypothyroidism; URT irr
Canada - Colombie-Britannique Limites D'Exposition Professionnelle	iodure-de-potassium	Iodides	Pas Disponible	Pas Disponible	Pas Disponible	Pas Disponible

LIMITES D'URGENCE

Composant	Nom du produit	TEEL-1	TEEL-2	TEEL-3
sodium hydroxide	Sodium hydroxide	Pas Disponible	Pas Disponible	Pas Disponible
sodium borate, decahydrate	Sodium borate decahydrate	6 mg/m3	22 mg/m3	780 mg/m3
sodium borate, decahydrate	Sodium borate; (Disodium tetraborate; Borates, tetrasodium salts)	6 mg/m3	6 mg/m3	240 mg/m3
mercuric iodide	Mercuric iodide; (Mercury(II) iodide)	0.057 mg/m3	0.23 mg/m3	63 mg/m3
potassium iodide	Potassium iodide	0.18 mg/m3	1.9 mg/m3	140 mg/m3

Composant	IDLH originale	IDLH révisé
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	Pas Disponible	Pas Disponible
HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	250 mg/m3	10 mg/m3
tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528	Pas Disponible	Pas Disponible
diiodure-de-mercure	28 mg/m3	10 mg/m3
iodure-de-potassium	Pas Disponible	Pas Disponible

Contrôles de l'exposition

Contrôle d'ingéniérie approprié	Une ventilation locale d'évacuation est habituellement nécessaire. Si un risque d'exposition existe, il faut porter un respirateur approuvé. Un bon ajustement des vêtements est essentiel pour obtenir une protection adéquate. Un respirateur avec apport d'air peut être nécessaire dans des circonstances spéciales. Un appareil de respiration autonome approuvé (SCBA) peut être nécessaire dans certaines situations.
Protection Individuelle	
Protection des yeux/du visage.	▸ Lunettes de protection chimique. Protection faciale complète. ▸ **NE PAS** porter de lentilles de contact. Les lentilles de contact posent un risque particulier ; les lentilles souples absorbent les irritants et toutes les lentilles les concentrent.
Protection de la peau	Voir protection Main ci-dessous
Protection des mains / pieds	Des gants en PVC remontant jusqu'au coude. Lors de la manipulation de liquides corrosifs, porter un pantalon ou un cache au dessus des bottes afin d'éviter les éclaboussures d'y entrer. **NOTE:** Le produit peut provoquer une sensibilisation de la peau chez les individus prédisposés. Une attention doit être prise, quand la personne retire ses gants de protection et ses équipements de protection, afin d'éviter un possible contact avec la peau.
Protection corporelle	Voir Autre protection ci-dessous
Autres protections	▸ Protections. ▸ Tablier en PVC. ▸ Une combinaison de protection en PVC peut s'avérer nécessaire si l'exposition est grave. ▸ Unité de nettoyage pour les yeux.

Continued...

	▸ Assurez-vous qu'il y ait un accès libre à une douche de sécurité.
Les risques thermiques	Pas Disponible

Produit(s) recommandé(s)

INDEX DE SELECTION DES GANTS

La sélection des gants est basée sur une présentation modifiée du:
"Forsberg Clothing Performance Index".
L(Les)'effet(s) de la (des) substance(s) suivante(s) sont prises en compte dans la sélection générée par ordinateur.
Ammonia CHEMets & VACUettes Refills and Ammonia Vacu-vials Ampoules

Matériel	CPI
BUTYL	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/CHLOROBUTYL	C

* CPI - Index de Performance Chemwatch
A: Meilleure Sélection
B: Satisfaisant ; peut se dégrader après 4 heures d'immersion continue.
C: Choix Pauvre ou Dangereux pour d'autre qu'une immersion à court terme.
REMARQUE: Comme une série de facteurs influenceront la performance actuelle des gants, une sélection finale doit être basée sur l'observation détaillée -
* Quand les gants doivent être utilisés sur une base à court terme, peu fréquente ou temporaire, les facteurs tels que le 'touché' ou la commodité (e.g. disponibilité), peuvent orienter le choix des gants qui peuvent être sinon inadaptés suite à une utilisation à long terme ou fréquente. Un médecin qualifié devrait être consulté.

Protection respiratoire

SECTION 9 PROPRIÉTÉS PHYSIQUES ET CHIMIQUES

Informations sur les propriétés physiques et chimiques essentielles

Aspect	Pale yellow

État Physique	Liquid	**Densité relative (Water = 1)**	1.1
Odeur	Odourless	**Coefficient de partition n-octanol / eau**	Pas Disponible
Seuil pour les odeurs	Pas Disponible	**Température d'auto-allumage (°C)**	Pas Disponible
pH (comme fourni)	13.5	**Température de décomposition**	Pas Disponible
Point de fusion / point de congélation (° C)	0	**Viscosité (cSt)**	Pas Disponible
Point d'ébullition initial et plage d'ébullition (° C)	100	**Poids Moléculaire (g/mol)**	Pas Disponible
Point d'éclair (°C)	Sans Objet	**goût**	Pas Disponible
Taux d'évaporation	Pas Disponible	**Propriétés explosives**	Pas Disponible
Inflammabilité	Sans Objet	**Propriétés oxydantes**	Pas Disponible
Limite supérieure d'explosivité	Pas Disponible	**La tension de surface (dyn/cm or mN/m)**	Pas Disponible
Limite inférieure d'explosivité (LIE)	Pas Disponible	**Composé volatile (%vol)**	Pas Disponible
Pression de vapeur (kPa)	Pas Disponible	**Groupe du Gaz**	Pas Disponible
hydrosolubilité (g/L)	miscible	**pH en solution**	Pas Disponible
Densité de vapeur (Air = 1)	Pas Disponible	**VOC g/L**	Pas Disponible

Continued...

SECTION 10 STABILITÉ ET RÉACTIVITÉ

Réactivité	Voir section 7
Stabilité chimique	▸ Présence de matériaux incompatibles. ▸ Le produit est considéré stable. ▸ Une polymérisation dangereuse n'aura pas lieu.
Possibilité de réactions dangereuses	Voir section 7
Conditions à éviter	Voir section 7
Matières incompatibles	Voir section 7
Produits de décomposition dangereux	Voir Section 5

SECTION 11 INFORMATIONS TOXICOLOGIQUES

Informations sur les effets toxicologiques

Inhalé	L'inhalation de vapeurs d'aérosols (brumes ou fumées), générées par le produit durant une manipulation normale, peut produire des effets très toxiques, ceux-ci pouvant être fatals. Le produit à la capacité de provoquer une irritation respiratoire chez certaines personnes. Les réponses du corps à une telle irritation peuvent causer d'autres dommages aux poumons.
Ingestion	L'ingestion accidentelle du matériel peut avoir des **effets toxiques**; selon des expériences sur des animaux, l'ingestion de moins de 5 grammes serait fatale ou nuirait gravement à la santé de l'individu. Le produit à la capacité de provoquer des brûlures chimiques importantes dans la cavité orale et les voies gastriques, à la suite d'une ingestion.
Contact avec la peau	Un contact de la peau avec le matériau peut engendrer d'importants effets toxiques; des effets systémiques peuvent survenir après une absorption et peuvent être fatals. Le matériau peut produire des d'importantes brûlures chimiques après un contact directe avec la peau. Le coupures ouvertes, une peau irritée ou abrasive ne devrait pas être exposé à ce produit. Une entrée dans le système sanguin, via par exemple, des coupures, des abrasions ou des lésions, peut produire des blessures systémiques avec des effets nocifs. Examiner les peau avant l'utilisation du produit et s'assurer que les dommages externes sont correctement protégés.
Yeux	Le produit peut causer des brûlures de chaleur après un contact direct avec les yeux. Les vapeurs et poussières peuvent être extrêmement irritantes. Si appliqué aux yeux, ce produit provoque des dommages importants aux yeux.
Chronique	Une exposition répétée ou prolongée à des corrosifs peut engendrer une érosion des dents, des variations ulcératives et inflammatoires dans la bouche et une nécrose (rarement) de la mâchoire. Une irritation des bronches, avec de la toux, et de fréquentes attaques d'une broncho-pneumonie peut s'ensuivre. Des perturbations gastro-intestinales peuvent également survenir. Des expositions chroniques peuvent engendrer une dermite et/ou une conjonctivite. Une accumulation de la substance, dans le corps humain, est probable et peut provoquer certains soucis à la suite d'expositions professionnelles répétées ou à long terme.

Ammonia CHEMets & VACUettes Refills and Ammonia Vacu-vials Ampoules	**TOXICITÉ**	**IRRITATION**
Ammonia CHEMets & VACUettes Refills and Ammonia Vacu-vials Ampoules	**TOXICITÉ**	**IRRITATION**

EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	Aucune donnée significative de toxicologie aiguë identifiée dans la littérature.
HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	Le produit peut produire une importante irritation des yeux provoquant une inflammation importante. Une exposition prolongée ou répétée aux irritants peut produire des conjonctivites. Le produit peut causer une irritation importante de la peau après une exposition prolongée ou répétée et peut produire au contact de la peau des rougeurs, des tuméfactions, une production de vésicules, la formation d'écailles et un épaississement de la peau. Les symptômes semblables à l'asthme peuvent durer des mois ou même des années après que l'exposition air cessée. Ceci peut être du à une condition non-allergique connue comme syndrome réactif de dysfonctionnement des voies respiratoires (RADS) qui peut apparaître à la suite d'une exposition à des forts niveaux de composés fortement irritants.
TÉTRABORATE-DE-DISODIUM,-DÉCAHYDRATE,-À-L'EXCLUSION-DU-BORATE-NATUREL-DU-N--2528	Les symptômes semblables à l'asthme peuvent durer des mois ou même des années après que l'exposition air cessée. Ceci peut être du à une condition non-allergique connue comme syndrome réactif de dysfonctionnement des voies respiratoires (RADS) qui peut apparaître à la suite d'une exposition à des forts niveaux de composés fortement irritants. Les critères clés pour le diagnostique d'un RADS incluent l'absence de maladie respiratoire précédente, chez un individu non-atypique, avec l'apparition abrupte de symptômes semblables à l'asthme dans les minutes ou les heures à une exposition connue à l'irritant. Un modèle de respiration réversible, au spiromètre, avec la présence modérée à importante d'hyperactivité des bronches au cours d'un test à la méthacholinium et l'absence d'une inflammation lymphatique minimale, sans éosinophilie, ont également été inclus dans les critères pour le diagnostique d'un RADS. Le RADS (ou asthme) suivant une inhalation irritante est un désordre rare avec des taux reliés à la concentration et à la durée de l'exposition à la substance irritante. Oral (rat) LD50: 4500-5000 mg/kg Eyes (rabbit) (-) Mild [Orica BORAX-Europe] Reproductive effector in rats Mutagenic towards bacteria
DIIODURE-DE-MERCURE	Une exposition au produit pour des périodes prolongées peut provoquer des défauts physiques dans le développement de l'embryon (tératogenèse) Dyspnae, diarrhoea, nausea and vomiting, foetotoxicity and teratogenesis recorded.
Ammonia CHEMets & VACUettes Refills and Ammonia Vacu-vials Ampoules, IODURE-	Les allergies de contact se manifestent rapidement sous forme d'eczéma, ou moins fréquemment sous forme d'urticaires ou d'œdème de Quincke. La pathogenèse des eczémas de contact comprends une réaction de cellules médiatrices immunisées (T lymphocytes) du type retardé.

Continued...

DE-POTASSIUM	Les autres réactions allergiques de la peau, e.g. contact urticant, comprennent des réactions d'anti-corps médiateurs immunisés. La signification du contact allergique n'est pas seulement déterminée par son potentiel de sensibilité : la répartition de la substance et les opportunités d'un contact avec elle sont également importantes. Une substance faiblement sensible qui est largement répandue peut être un allergène plus important qu'une avec un fort potentiel sensibilisant avec peu d'individus au contact.

toxicité aiguë	✔	**Cancérogénicité**	⊘
Irritation / corrosion	✔	**reproducteur**	⊘
Lésions oculaires graves / irritation	✔	**STOT - exposition unique**	✔
Sensibilisation respiratoire ou cutanée	✔	**STOT - exposition répétée**	✔
Mutagénéïté	⊘	**risque d'aspiration**	⊘

Légende: ✔ *– Données nécessaires à la classification disponible*
✘ *– Données disponibles, mais ne remplit pas les critères de classification*
⊘ *– Données non disponibles pour faire la classification*

statut CMR

peau	diiodure-de-mercure	Canada - British Columbia Occupational Exposure Limits - Skin|Canada - Alberta Occupational Exposure Limits - Skin	Skin; R|1

SECTION 12 INFORMATIONS ÉCOLOGIQUES

Toxicité

Nocif pour les organismes aquatiques, peut entraîner des effets néfastes à long terme pour l'environnement aquatique.
NE PAS PERMETTRE au produit d'entrer en contact avec les eaux de surface ou les zones intertidales en-dessous de la moyenne de la marque supérieure. Ne pas contaminer l'eau durant le nettoyage ou l'élimination de l'équipement de nettoyage.
Les déchets résultants de l'utilisation du produit doivent être éliminés sur un ou des sites approuvés.
Prévenir, par tous les moyens possibles, les éclaboussures d'entrer dans les drains et les voies d'eau.

Persistance et dégradabilité

Composant	Persistance: Eau/Sol	Persistance: Air
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	BAS	BAS
HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	BAS	BAS
iodure-de-potassium	HAUT	HAUT

Potentiel de bioaccumulation

Composant	Bioaccumulation
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	BAS (LogKOW = -1.38)
HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	BAS (LogKOW = -3.8796)
iodure-de-potassium	BAS (LogKOW = 0.0436)

Mobilité dans le sol

Composant	Mobilité
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	BAS (KOC = 14.3)
HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE	BAS (KOC = 14.3)
iodure-de-potassium	BAS (KOC = 14.3)

SECTION 13 CONSIDÉRATIONS RELATIVES À L'ÉLIMINATION

Méthodes de traitement des déchets

Elimination du produit / emballage	

SECTION 14 INFORMATIONS RELATIVES AU TRANSPORT

Continued...

Etiquettes nécessaires

Polluant marin	aucun

Transport par terre (TDG)

Numéro ONU	1760
Groupe d'emballage	II
Nom d'expédition des Nations unies	LIQUIDE CORROSIF, NSA (contains sodium hydroxide and mercuric iodide)
Dangers pour l'environnement	Aucune donnée appropriée
Classe(s) de danger pour le transport	classe: 8 Risque Secondaire: Sans Objet
Précautions particulières à prendre par l'utilisateur	Dispositions particulières: 16

Transport aérien (ICAO-IATA / DGR)

Numéro ONU	1760
Groupe d'emballage	II
Nom d'expédition des Nations unies	LIQUIDE CORROSIF, NSA (contains sodium hydroxide and mercuric iodide)
Dangers pour l'environnement	Aucune donnée appropriée
Classe(s) de danger pour le transport	Classe ICAO/IATA: 8 Sous-risque ICAO/IATA: Sans Objet Code ERG: 8L
Précautions particulières à prendre par l'utilisateur	Dispositions particulières: A3A803 Instructions d'emballage pour cargo uniquement: 855 Maximum Qté / Paquet pour cargo uniquement: 30 L Instructions d'emballage pour cargo et vaisseaux passagers: 851 Quantité maximale Passager et Cargo / Paquet: 1 L Qté de paquets limités dans avion passager et de cargaison: Y840 Quantité Limitée Quantité maximale Passager et Cargo / Paquet: 0.5 L

Transport Maritime (IMDG-Code / GGVSee)

Numéro ONU	1760
Groupe d'emballage	II
Nom d'expédition des Nations unies	LIQUIDE CORROSIF, NSA (contains sodium hydroxide and mercuric iodide)
Dangers pour l'environnement	Sans Objet
Classe(s) de danger pour le transport	Classe IMDG: 8 IMDG Sous-risque: Sans Objet
Précautions particulières à prendre par l'utilisateur	N° EMS: F-A , S-B Dispositions particulières: 274 Quantités limitées: 1 L

SECTION 15 INFORMATIONS RÉGLEMENTAIRES

Réglementations/législation particulières à la substance ou au mélange en matière de sécurité, de santé et d'environnement

Ce produit a été classé conformément aux critères de risque du Règlement sur les produits contrôlés et la fiche signalétique contient tous les renseignements exigés par le Règlement sur les produits contrôlés.

EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ(7732-18-5) Est disponible dans les textes	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada Liste Intérieure des Substances (DSL)"

Continued...

réglementaires suivants	
HYDROXYDE-DE-SODIUM,-EN-SOLUTION-AQUEUSE(1310-73-2) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada - Colombie-Britannique Limites D'Exposition Professionnelle","Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)","Canada en identité judiciaire services chimique cancérigène évaluation - Tableau 1 - Produits chimiques considérées pour l'évaluation (Français)","Canada Liste Intérieure des Substances (DSL)","Canada - Nouvelle-Écosse Limites d'exposition professionnelle","Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle","Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination","Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail","Canada en identité judiciaire services chimique cancérigène évaluation - Tableau 1 - Produits chimiques considérées pour l'évaluation (en anglais)","Canada - Limites d'exposition professionnelle de l'Alberta","Canada - Yukon concentrations admissibles pour les substances aéroportées contaminants"
tétraborate-de-disodium,-décahydrate,-à-l'exclusion-du-borate-naturel-du-n--2528(1303-96-4) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)","Canada Liste Intérieure des Substances (DSL)","Canada - Nouvelle-Écosse Limites d'exposition professionnelle","Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle","Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination","Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail","Canada - Limites d'exposition professionnelle de l'Alberta"
diiodure-de-mercure(7774-29-0) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada - Colombie-Britannique Limites D'Exposition Professionnelle","Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)","Canada Liste Intérieure des Substances (DSL)","Canada - Nouvelle-Écosse Limites d'exposition professionnelle","Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle","Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination","Agence Internationale pour la Recherche sur le Cancer (CIRC) - Agents classés par les Monographies du CIRC","Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail","Canada - Limites d'exposition professionnelle de l'Alberta","Canada - Yukon concentrations admissibles pour les substances aéroportées contaminants"
iodure-de-potassium(7681-11-0) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada - Colombie-Britannique Limites D'Exposition Professionnelle","Canada Liste Intérieure des Substances (DSL)","Canada - Nouvelle-Écosse Limites d'exposition professionnelle","Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle"

SECTION 16 AUTRES INFORMATIONS

autres informations

Ingrédients avec plusieurs numéros CAS

Nom	Numéro CAS
Pas Disponible	Pas Disponible
Pas Disponible	Pas Disponible

La classification de la substance et de ses ingrédients provient de sources officielles ainsi que d'une révision indépendante par le comité de classification de Chemwatch à l'aide de références littéraires.
Une liste des références utilisées par le comité se trouve sur le site suivant: www.chemwatch.net/references

La fiche technique santé-sécurité ((M)SDS) est un outil de communication orienté sur le risque et qui doit être utilisé dans le cadre de la politique d'évaluation du risque. De nombreux facteurs peuvent influencer la diffusion d'information au sujet des risques sur le lieu de travail ou dans d'autres cadres. Les risques peuvent être déterminés en référence à des Scénarios d'exposition. L'échelle d'usage, la fréquence d'utilisation et les mécanismes techniques disponibles et actuels doivent faire l'objet d'une réflexion poussée.

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end of SDS

Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: S1500

Version No.: 1.1

Product Name: Stabilizer Solutions for Ammonia CHEMets® and Vacu-vials® Kits

Part Nos.: A-1500, A-1501

Product Descriptions:

Stabilizer Solution: Plastic bottle containing liquid reagent. Each bottle of A-1500 solution contains approximately 9 mL of liquid reagent. Each bottle of A-1501 solution contains approximately 18 mL of liquid reagent. Test kits contain one bottle of A-1500 solution and two bottles of A-1501 solution. Stabilizer Solution packs contain six (6) bottles of solution.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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4295 Catlett Road, Midland, VA 22728 ▪ P: 800.356.3072 ▪ F: 540.788.4856 ▪ www.chemetrics.com

Stabilizer Solutions for Ammonia CHEMets and Vacu-vials Kits

CHEMetrics, Inc.

Chemwatch: **9-82029**
SDS No: **S1500**
Version Num: **1.1**

Code d'alerte du risque: **2**

Date de revision: **08/10/2014**
Date d'impression: **13/03/2015**
date initiale: **09/10/2014**
S.GHS.CAN.FR

SECTION 1 IDENTIFICATION DE LA SUBSTANCE/DU MÉLANGE ET DE LA SOCIÉTÉ/L'ENTREPRISE

Identificateur de produit

Nom du produit	Stabilizer Solutions for Ammonia CHEMets and Vacu-vials Kits
Synonymes	Part Nos.: A-1500, A-1501
Nom d'expédition	Sans Objet
Formule chimique	Sans Objet
Autres moyens d'identification	Pas Disponible
Numéro CAS	Sans Objet

Utilisations identifiées pertinentes de la substance ou du mélange et utilisations déconseillées

Utilisations identifiées pertinentes :	Components of water analysis test kits K-1503, K-1510, K-1523

Renseignements concernant le fournisseur de la fiche de données de sécurité

Nom commercial de l'entreprise	CHEMetrics, Inc.
Adresse	4295 Catlett Road, Midland, VA. 22728 United States
Téléphone	1-540-788-9026
Fax	1-540-788-4856
Site Internet	www.chemetrics.com
Courriel	technical@chemetrics.com

Numéro d'appel d'urgence

Association / Organisation	ChemTel Inc.
Numéro de téléphone d'appel d'urgence	1-800-255-3924
Autres numéros de téléphone d'urgence	+01-813-248-0585

SECTION 2 IDENTIFICATION DES DANGERS

Classification de la substance ou du mélange

Continued...

Classification de SGH	TOXICITÉ AIGUË PAR VOIE ORALE Catégorie 4, Irritation/corrosion cutanée catégorie 2, Irritation occulaire catégorie 2A

Éléments d'étiquetage

Éléments pour étiquette GHS	
MENTION D'AVERTISSEMENT	**ATTENTION**

Déclaration(s) sur les risques

H302	Nocif en cas d'ingestion.
H315	Provoque une irritation cutanée.
H319	Provoque une sévère irritation des yeux.

Déclarations de Sécurité: Prévention

P101	En cas de consultation d'un médecin, garder à disposition le récipient ou l'étiquette.
P102	Tenir hors de portée des enfants.
P103	Lire l'étiquette avant utilisation.
P270	Ne pas manger, boire ou fumer en manipulant ce produit.
P280	Porter des gants de protection/des vêtements de protection/un équipement de protection des yeux/du visage.

Déclarations de Sécurité: Réponse

P305+P351+P338	EN CAS DE CONTACT AVEC LES YEUX: Rincer avec précaution à l'eau pendant plusieurs minutes. Enlever les lentilles de contact si la victime en porte et si elles peuvent être facilement enlevées. Continuer à rincer.
P337+P313	Si l'irritation oculaire persiste: Consulter un médecin.
P301+P312	INGESTION: Appeler un CENTRE ANTIPOISON / un médecin / médecin / secouriste / en cas de malaise.
P302+P352	SI SUR LA PEAU: laver abondamment à l'eau et au savon
P330	Rincer la bouche.

Déclarations de Sécurité: Stockage

Sans Objet

Déclarations de Sécurité: Élimination

P501	Éliminer le contenu / récipient à décharge chimique agréé ou si organique à l'incinération à haute température

SECTION 3 COMPOSITION/INFORMATIONS SUR LES COMPOSANTS

Substances

Voir la section ci-dessous pour la composition des mélanges

Mélanges

Numéro CAS	%[poids]	Nom
1310-58-3	<1	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE
111-46-6	5	2,2'-oxydiéthanol
6381-59-5	27	tartrate-de-potassium-et-de-sodium
7732-18-5	>67	EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ

SECTION 4 PREMIERS SECOURS

Description des premiers secours

Contact des yeux	Si ce produit entre en contact avec les yeux : ▸ Maintenir immédiatement les yeux ouverts et laver avec de l'eau claire. ▸ S'assurer de la complète irrigation des yeux en conservant les paupières ouvertes et loin des yeux et en bougeant les paupières en soulevant occasionnellement les paupières hautes et basses. ▸ Si la douleur persiste ou réapparaît, rechercher un avis médical. ▸ Des lentilles de contact ne doivent être retirées que par une personne formée.
Contact avec la peau	Si le produit entre en contact avec la peau: ▸ Retirer immédiatement tous les vêtements contaminés, chaussures incluses. ▸ Laver les zones affectées à grand eau (et du savon si disponible). ▸ Rechercher un avis médical dans le cas d'une irritation.
Inhalation	▸ En cas d'inhalation de fumées ou d'ingestion de produits de combustion : Déplacez-vous vers un endroit aéré. ▸ En général, d'autres mesures ne sont pas nécessaires.
Ingestion	▸ **EN CAS D'INGESTION, FAITES APPEL A UNE ASSISTANCE MÉDICALE DANS LES PLUS BREFS DÉLAIS.** ▸ demandez conseil auprès d'un centre antipoison ou d'un médecin. ▸ Il est probable qu'un traitement hospitalier d'urgence soit nécessaire.

Continued...

	▸ En attendant, la personne doit être prise en charge par du personnel formé aux premiers secours qui prendra des mesures d'accompagnement selon la situation observée et l'état du patient. ▸ Si l'intervention immédiate d'un médecin est possible, le patient doit lui être confié ainsi qu'un exemplaire de la FDS. Il appartiendra ensuite au spécialiste médical, et à lui seul, de prendre toute autre action. ▸ Si aucune intervention médicale ne peut avoir lieu sur le site de travail ou ses environs, transférez le patient à l'hôpital accompagné d'un exemplaire de la FDS. **Lorsque qu'une intervention médicale immédiate ne peut avoir lieu, ou lorsque le patient est à plus de 15 minutes d'un hôpital, ou encore dans les cas prévus expressément:** ▸ **PROVOQUEZ** des vomissements chez le patient en insérant les doigts vers l'arrière de sa gorge, **UNIQUEMENT SI LE PATIENT EST CONSCIENT**. Pencher le patient vers l'avant ou le coucher sur le côté gauche (tête en arrière si possible) pour maintenir ouvertes les voies respiratoires et empêcher l'inhalation du produit. **REMARQUE:** Portez des gants de protection pour provoquer le mécanisme de vomissement.

Indication des éventuels soins médicaux immédiats et traitements particuliers nécessaires

pour les poisons (dans le cas ou un régime de traitement est absent) :

TRAITEMENT DE BASE

- Etablir des voies respiratoires notables avec succion si nécessaire.
- Surveiller les signes d'insuffisance respiratoire et assister la ventilation si nécessaire.
- Administrer de l'oxygène par un masque avec non-retour à de 10 à 15 l/min.
- Surveiller et traiter, quand nécessaire, contre un choc.
- Surveiller et traiter, quand nécessaire, contre un œdème pulmonaire.
- Anticiper les crises.
- **NE PAS** utiliser d'émétiques . Quand une ingestion est suspectée, rincer la bouche et donner jusqu'à 200 ml d'eau (5 ml/kg recommandé) pour la dilution quand le patient est capable d'avaler, possède un fort réflexe pharyngé et ne bave pas.

TRAITEMENT AVANCE

- Envisager une intubation orotrachéale ou nasotrachéale pour un contrôle des voies respiratoires chez un patient inconscient ou chez qui un arrêt respiratoire est apparu.
- Une ventilation à pression positive à l'aide d'un masque avec valve peut s'avérer utile.
- Surveiller et traiter, quand nécessaire, contre l'arythmie.
- Débuter un IV D5W TKO. Si des signes d'hypovolémie sont présents, utiliser une solution lactée Ringers. Une surcharge de fluide peut créer des complications.
- Une thérapie avec drogue doit être envisager pour un œdème pulmonaire.
- Une hypotension sans signe d'hypovolémie peut nécessiter des vasopresseurs. Une hypotension avec des signes d'hypovolémie nécessite l'administration précautionneuse de fluides. Une surcharge de fluide peut créer des complications.
- Traiter les crises avec du diazépam.
- Le chlorhydrate de proparacaine doit être utiliser pour aider l'irrigation des yeux.

BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994
Traiter symptomatiquement.

SECTION 5 MESURES DE LUTTE CONTRE L'INCENDIE

Moyens d'extinction

	Le produit contient une proportion substantielle d'eau et donc il n'y a pas de restriction sur le type de média d'extinction à utiliser. Le choix du média d'extinction doit prendre en compte les zones environnantes. Bien que le produit soit non-combustible, l'évaporation de l'eau depuis le mélange, provoqué par la chaleur d'un incendie proche, peut engendrer le flottement de couches de substances combustibles. Dans un tel cas, envisager : ▸ Mousse ▸ Poudre chimique sèche ▸ Dioxyde de carbone

Dangers particuliers résultant de la substance ou du mélange

Incompatibilité au feu	Non connu.

Conseils aux pompiers

Lutte Incendie	▸ Appelez les pompiers et indiquez-leur le lieu et la nature du risque. ▸ Mettez un appareil respiratoire et des gants de protection conçus pour lutter contre le feu.
Risque D'Incendie/Explosion	▸ Le matériel n'est pas combustible d'emblée dans des conditions normales. ▸ Cependant, il se décomposera en cas d'incendie et les composés organiques pourraient brûler. ▸ Il ne s'agit pas d'un risque de feu majeur. ▸ La chaleur peut entraîner l'expansion ou la décomposition ainsi qu'une explosion des récipients. ▸ La décomposition due à la chaleur peut engendrer des fumées toxiques de monoxyde de carbone (CO).

SECTION 6 MESURES À PRENDRE EN CAS DE DISPERSION ACCIDENTELLE

Précautions individuelles, équipement de protection et procédures d'urgence

Eclaboussures Mineures	▸ Nettoyez tout de suite tous les écoulements. ▸ Evitez de respirer les vapeurs et le contact avec la peau et les yeux. ▸ Contrôlez le contact de votre corps en portant un équipement de protection. ▸ Contenez et absorbez le liquide avec du sable, de la terre, du matériel inerte ou de la vermiculite. ▸ Essuyez.
Eclaboussures Majeures	Risque modéré. ▸ Vider la zone de son personnel non-protégé et se déplacer contre le vent. ▸ Appelez les pompiers et donnez-leur le lieu et la nature du risque. ▸ Mettez un appareil respiratoire et des gants de protection. ▸ Evitez par tous les moyens possibles les déversements dans les egouts et canalisations et les cours d'eau.

Continued...

	Le conseil sur l'équipement de protection individuel est contenu dans la rubrique 8 de la FDS..

SECTION 7 MANIPULATION ET STOCKAGE

Précautions à prendre pour une manipulation sans danger

Manipulation Sure	▸ Eviter tout contact personnel, inhalation incluse. ▸ Porter des vêtements de protection en cas de risques d'exposition. ▸ Utiliser dans un lieu bien ventilé. ▸ Prévenir une concentration dans les trous et les creux. ▸ **NE PAS** entrer dans des espaces confinés avant que l'atmosphère ne soit vérifiée.
Autres Données	

Conditions d'un stockage sûr, y compris d'éventuelles incompatibilités

Container adapté	▸ Emballage en polypropylène ou polyéthylène. réservoir en plastique. ▸ Emballage conforme aux règles du fabricant. ▸ Vérifier que tous les containers sont clairement étiquetés et sans fuite.
Incompatibilite de Stockage	Inconnu.

INCOMPATIBILITÉS DU MATÉRIELLE D'EMBALLAGE

Pas Disponible

SECTION 8 CONTRÔLES DE L'EXPOSITION/PROTECTION INDIVIDUELLE

Paramètres de contrôle

VALEURS LIMITES D'EXPOSITION PROFESSIONNELLE (VLEP)

DONNEES SUR LES INGREDIENTS

Source	Composant	Nom du produit	VME	STEL	pic	Notes
Canada - Yukon concentrations admissibles pour les substances aéroportées contaminants	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium hydroxide	2 mg/m3 / --- ppm	--- mg/m3 / --- ppm	Pas Disponible	Pas Disponible
Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	Pas Disponible
Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Hydroxyde de potassium	Pas Disponible	Pas Disponible	2 mg/m3	Pas Disponible
Canada - Nouvelle-Écosse Limites d'exposition professionnelle	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	TLV Basis: upper respiratory tract, eye & skin irritation
Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	TLV® Basis: URT, eye, & skin irr
Canada - Limites d'exposition professionnelle de l'Alberta	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium hydroxide	Pas Disponible	Pas Disponible	2 mg/m3	Pas Disponible
Canada - Colombie-Britannique Limites D'Exposition Professionnelle	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium hydroxide	Pas Disponible	Pas Disponible	C 2 mg/m3 mg/m3	Pas Disponible
Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Potassium, hydroxyde de	Pas Disponible	P2 mg/m3	Pas Disponible	RP

LIMITES D'URGENCE

Composant	Nom du produit	TEEL-1	TEEL-2	TEEL-3
potassium hydroxide	Potassium hydroxide	0.18 mg/m3	2 mg/m3	54 mg/m3
diethylene glycol	Diethylene glycol	6.9155 ppm	80 ppm	250 ppm
potassium sodium tartrate	Sodium potassium tartrate; (Potassium sodium tartrate)	3.2 mg/m3	36 mg/m3	210 mg/m3
potassium sodium tartrate	Sodium potassium tartrate tetrahydrate	3.2 mg/m3	36 mg/m3	210 mg/m3

Composant	IDLH originale	IDLH révisé
HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Pas Disponible	Pas Disponible
2,2'-oxydiéthanol	Pas Disponible	Pas Disponible
tartrate-de-potassium-et-de-sodium	Pas Disponible	Pas Disponible

Continued...

EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	Pas Disponible	Pas Disponible

Contrôles de l'exposition

Contrôle d'ingéniérie approprié	Un échappement général est adéquat dans des conditions de fonctionnement normales. Une ventilation d'échappement locale peut être nécessaire dans des conditions spécifiques. Si un risque de surexposition existe, porter un respirateur approuvé. Un ajustement correct est essentiel pour obtenir une protection adéquate. Fournir une ventilation adéquate dans les entrepôts et les lieux de stockage fermés.
Protection Individuelle	
Protection des yeux/du visage.	▸ Lunettes de sécurité avec des protections sur le côté. ▸ Masque chimique. ▸ Les lentilles de contact constituent un risque particulier; les lentilles molles peuvent absorber les produits irritants et toutes les lentilles les concentrent. NE mettez PAS des lentilles de contact.
Protection de la peau	Voir protection Main ci-dessous
Protection des mains / pieds	Porter des gants de protection contre les produits chimiques, par exemple en PVC. Porter des chaussures de sécurité ou des bottes en plastique. La durée et l'aptitude des types de gants dépendent de l'usage. Les facteurs suivants sont importants lors du choix de gants : fréquence et durée des contacts, résistance chimique du matériau qui constitue les gants, épaisseur des gants et dextérité.
Protection corporelle	Voir Autre protection ci-dessous
Autres protections	▸ Tenue complète. ▸ Tablier en P.V.C. ▸ Crème protectrice. ▸ Crème nettoyante pour la peau. ▸ Unité de lavement des yeux.
Les risques thermiques	Pas Disponible

Produit(s) recommandé(s)

INDEX DE SELECTION DES GANTS

La sélection des gants est basée sur une présentation modifiée du:
"Forsberg Clothing Performance Index".
L(Les)'effet(s) de la (des) substance(s) suivante(s) sont prises en compte dans la sélection générée par ordinateur.
Stabilizer Solutions for Ammonia CHEMets and Vacu-vials Kits

Matériel	CPI
BUTYL	A
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NITRILE	C
NITRILE+PVC	C
PVA	C
PVC	C
VITON	C

* CPI - Index de Performance Chemwatch
A: Meilleure Sélection
B: Satisfaisant ; peut se dégrader après 4 heures d'immersion continue.
C: Choix Pauvre ou Dangereux pour d'autre qu'une immersion à court terme.
REMARQUE: Comme une série de facteurs influenceront la performance actuelle des gants, une sélection finale doit être basée sur l'observation détaillée -
* Quand les gants doivent être utilisés sur une base à court terme, peu fréquente ou temporaire, les facteurs tels que le 'touché' ou la commodité (e.g. disponibilité), peuvent orienter le choix des gants qui peuvent être sinon inadaptés suite à une utilisation à long terme ou fréquente. Un médecin qualifié devrait être consulté.

Protection respiratoire

Filtre de type A-P de capacité suffisante (AS / NZS 1716 et 1715, EN 143:2000 et 149:2001, ANSI Z88 ou équivalent national)

Dans le cas où la concentration en gaz/particules en suspension dans la zone respirable approche ou excède "le standard d'exposition" (ou SE), une protection respiratoire est requise. Le degrés de protection varie avec le type de couverture du masque et la classe du filtre ; la nature de la protection varie en fonction du type de filtre.

Facteur de protection	Demi-masque respiratoire	Respirateur intégral	Masque à adduction d'air
10 x ES	A-AUS P2	-	A-PAPR-AUS P2
50 x ES	-	A-AUS P2	-
100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Intégral

SECTION 9 PROPRIÉTÉS PHYSIQUES ET CHIMIQUES

Informations sur les propriétés physiques et chimiques essentielles

Aspect	Colorless

État Physique	Liquid	**Densité relative (Water = 1)**	1.12
Odeur	Odourless	**Coefficient de partition n-octanol / eau**	Pas Disponible
Seuil pour les odeurs	Pas Disponible	**Température d'auto-allumage (°C)**	Pas Disponible

Continued...

pH (comme fourni)	8	**Température de décomposition**	Pas Disponible
Point de fusion / point de congélation (° C)	10	**Viscosité (cSt)**	Pas Disponible
Point d'ébullition initial et plage d'ébullition (° C)	104	**Poids Moléculaire (g/mol)**	Pas Disponible
Point d'éclair (°C)	Sans Objet	**goût**	Pas Disponible
Taux d'évaporation	Pas Disponible	**Propriétés explosives**	Pas Disponible
Inflammabilité	Sans Objet	**Propriétés oxydantes**	Pas Disponible
Limite supérieure d'explosivité	Pas Disponible	**La tension de surface (dyn/cm or mN/m)**	Pas Disponible
Limite inférieure d'explosivité (LIE)	Pas Disponible	**Composé volatile (%vol)**	Pas Disponible
Pression de vapeur (kPa)	Pas Disponible	**Groupe du Gaz**	Pas Disponible
hydrosolubilité (g/L)	miscible	**pH en solution**	Pas Disponible
Densité de vapeur (Air = 1)	Pas Disponible	**VOC g/L**	Pas Disponible

SECTION 10 STABILITÉ ET RÉACTIVITÉ

Réactivité	Voir section 7
Stabilité chimique	▸ Présence de matériaux incompatibles. ▸ Le produit est considéré stable. ▸ Une polymérisation dangereuse n'aura pas lieu.
Possibilité de réactions dangereuses	Voir section 7
Conditions à éviter	Voir section 7
Matières incompatibles	Voir section 7
Produits de décomposition dangereux	Voir Section 5

SECTION 11 INFORMATIONS TOXICOLOGIQUES

Informations sur les effets toxicologiques

Inhalé	Le produit n'est pas connu pour produire des effets négatifs sur la santé ni des irritations du système respiratoire après une inhalation (tels que classifiées par les directives CE se basant sur des modèles animaux). Néanmoins, des effets négatifs systémiques ont été produit suite à l'exposition d'animaux par au moins une voie et la pratique d'une bonne hygiène requiert de conserver les expositions à un minimum et que des mesures de contrôle adaptées soient mises en place lors d'une pratique professionnel. Habituellement pas un risque en raison de la nature non-volatile de produit
Ingestion	Une ingestion accidentelle du matériel peut s'avérer dangereuse; selon des expériences sur des animaux, l'ingestion de moins de 150 grammes serait fatale ou nuirait gravement à la santé de l'individu.
Contact avec la peau	Ce produit à la capacité de provoquer une inflammation au contact de la peau chez certaines personnes. Le produit peut accentuer toute condition dermite pré-existante. Le coupures ouvertes, une peau irritée ou abrasive ne devrait pas être exposé à ce produit. Une entrée dans le système sanguin, via par exemple, des coupures, des abrasions ou des lésions, peut produire des blessures systémiques avec des effets nocifs. Examiner les peau avant l'utilisation du produit et s'assurer que les dommages externes sont correctement protégés.
Yeux	Le produit à la capacité de provoquer une irritation des yeux et des dommages chez certaines personnes.
Chronique	Une exposition à long terme au produit n'est pas connue comme produisant des effets négatifs chroniques pour la santé (tel que classé par les Directives CE utilisant des modèles animaux) ; néanmoins, une exposition par n'importe quelle voie devrait être minimisée.

Stabilizer Solutions for Ammonia CHEMets and Vacu-vials Kits	**TOXICITÉ**	**IRRITATION**
Stabilizer Solutions for Ammonia CHEMets and Vacu-vials Kits	**TOXICITÉ**	**IRRITATION**

HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Les symptômes semblables à l'asthme peuvent durer des mois ou même des années après que l'exposition air cessée. Ceci peut être du à une condition non-allergique connue comme syndrome réactif de dysfonctionnement des voies respiratoires (RADS) qui peut apparaître à la suite d'une exposition à des forts niveaux de composés fortement irritants. Les critères clés pour le diagnostique d'un RADS incluent l'absence de maladie respiratoire précédente, chez un individu non-atypique, avec l'apparition abrupte de symptômes semblables à l'asthme dans les minutes ou les heures à une exposition connue à l'irritant. Un modèle de respiration réversible, au spiromètre, avec la présence modérée à importante d'hyperactivité des bronches au cours d'un test à la méthacholinium et l'absence d'une inflammation lymphatique minimale, sans éosinophilie, ont également été inclus dans les critères pour le diagnostique d'un RADS. Le RADS (ou asthme) suivant une inhalation irritante est un désordre rare avec des taux reliés à la concentration et à la durée de l'exposition à la substance irritante.
2,2'-OXYDIÉTHANOL	Le produit peut causer une irritation de la peau après une exposition prolongée ou répétée et peut produire au contact de la peau des rougeurs, des tuméfactions, une production de vésicules, la formation d'écailles et un épaississement de la peau.

Continued...

Stabilizer Solutions for Ammonia CHEMets and Vacu-vials Kits, TARTRATE-DE-POTASSIUM-ET-DE-SODIUM, EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	Aucune donnée significative de toxicologie aiguë identifiée dans la littérature.

toxicité aiguë	✔	**Cancérogénicité**	⊘
Irritation / corrosion	✔	**reproducteur**	⊘
Lésions oculaires graves / irritation	✔	**STOT - exposition unique**	⊘
Sensibilisation respiratoire ou cutanée	⊘	**STOT - exposition répétée**	⊘
Mutagénéïté	⊘	**risque d'aspiration**	⊘

Légende: ✔ *– Données nécessaires à la classification disponible*
✘ *– Données disponibles, mais ne remplit pas les critères de classification*
⊘ *– Données non disponibles pour faire la classification*

statut CMR

Sans Objet

SECTION 12 INFORMATIONS ÉCOLOGIQUES

Toxicité

NE jetez PAS dans les égouts ou les canalisations.

Persistance et dégradabilité

Composant	Persistance: Eau/Sol	Persistance: Air
2,2'-oxydiéthanol	BAS	BAS
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	BAS	BAS

Potentiel de bioaccumulation

Composant	Bioaccumulation
2,2'-oxydiéthanol	BAS (BCF = 180)
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	BAS (LogKOW = -1.38)

Mobilité dans le sol

Composant	Mobilité
2,2'-oxydiéthanol	HAUT (KOC = 1)
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ	BAS (KOC = 14.3)

SECTION 13 CONSIDÉRATIONS RELATIVES À L'ÉLIMINATION

Méthodes de traitement des déchets

Elimination du produit / emballage	Percer les containers afin de prévenir une ré-utilisation. Les législations concernant les exigences pour l'élimination des déchets peuvent être différentes suivant les pays, régions ou/ou territoires. Chaque utilisateur doit se conformer aux lois régissant la zone où il se trouve. Dans des cas particuliers, certains déchets doivent faire l'objet d'un suivi. Une hiérarchisation des contrôles semble être une méthode commune - l'utilisateur doit étudier : ▸ La réduction, ▸ La réutilisation ▸ Le recyclage ▸ L'élimination (si tout le reste a échoué) Ce produit peut être recyclé s'il n'a pas été utilisé ou s'il n'a pas été contaminé de manière à le rendre impropre à l'utilisation prévue pour celui-ci.

SECTION 14 INFORMATIONS RELATIVES AU TRANSPORT

Etiquettes nécessaires

Polluant marin	aucun

Transport par terre (TDG): NON REGLEMENTE PAR LE CODE DES TRANSPORTS CONCERNANT LES MARCHANDISES DANGEREUSES

Continued...

Transport aérien (ICAO-IATA / DGR): NON REGLEMENTE PAR LE CODE DES TRANSPORTS CONCERNANT LES MARCHANDISES DANGEREUSES

Transport Maritime (IMDG-Code / GGVSee): NON REGLEMENTE PAR LE CODE DES TRANSPORTS CONCERNANT LES MARCHANDISES DANGEREUSES

Transport en vrac conformément à l'annexe II de la convention Marpol 73/78 et au recueil IBC

source	ingrédient	catégorie de pollution
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE	Y

SECTION 15 INFORMATIONS RÉGLEMENTAIRES

Réglementations/législation particulières à la substance ou au mélange en matière de sécurité, de santé et d'environnement

Ce produit a été classé conformément aux critères de risque du Règlement sur les produits contrôlés et la fiche signalétique contient tous les renseignements exigés par le Règlement sur les produits contrôlés.

HYDROXYDE-DE-POTASSIUM,-EN-SOLUTION-AQUEUSE(1310-58-3) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada - Colombie-Britannique Limites D'Exposition Professionnelle","Canada - Québec) Valeurs d'Exposition Admissibles des Contaminants atmosphériques (français)","Canada Liste Intérieure des Substances (DSL)","Canada - Île-du-Prince-Édouard Limites d'exposition professionnelle","Canada - Saskatchewan sur la santé et la sécurité au travail - des limites de contamination","Canada - Nouvelle-Écosse Limites d'exposition professionnelle","Canada - Territoires du Nord-Ouest Limite d'exposition en milieu de travail","Canada - Yukon concentrations admissibles pour les substances aéroportées contaminants","Canada - Limites d'exposition professionnelle de l'Alberta"
2,2'-oxydiéthanol(111-46-6) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada Liste Intérieure des Substances (DSL)"
tartrate-de-potassium-et-de-sodium(6381-59-5) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada Liste Intérieure des Substances (DSL)"
EAUX-DISTILLÉES,-DE-CONDUCTIBILITÉ-OU-DE-MÊME-DEGRÉ-DE-PURETÉ(7732-18-5) Est disponible dans les textes réglementaires suivants	"Canada Catégorisation des décisions pour toutes les substances de la LIS","Canada Liste Intérieure des Substances (DSL)"

SECTION 16 AUTRES INFORMATIONS

autres informations

Ingrédients avec plusieurs numéros CAS

Nom	Numéro CAS
Pas Disponible	Pas Disponible

La classification de la substance et de ses ingrédients provient de sources officielles ainsi que d'une révision indépendante par le comité de classification de Chemwatch à l'aide de références littéraires.
Une liste des références utilisées par le comité se trouve sur le site suivant: www.chemwatch.net/references

La fiche technique santé-sécurité ((M)SDS) est un outil de communication orienté sur le risque et qui doit être utilisé dans le cadre de la politique d'évaluation du risque. De nombreux facteurs peuvent influencer la diffusion d'information au sujet des risques sur le lieu de travail ou dans d'autres cadres. Les risques peuvent être déterminés en référence à des Scénarios d'exposition. L'échelle d'usage, la fréquence d'utilisation et les mécanismes techniques disponibles et actuels doivent faire l'objet d'une réflexion poussée.

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Safety Data Sheet

Color Comparators for CHEMetrics Visual Analysis Kits

Version number: 11.0
SDS Identifier: VC1510SS

Revision: 2024-03-27

SECTION 1: Identification

1.1 Product identifier

SDS Identifier: **VC1510SS**

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Color Comparators for CHEMetrics Visual Analysis Kits
Catalog #'s C-0001 through C-9999
See section 9 for further description

1.3 Details of the supplier of the safety data sheet

AquaPhoenix Scientific, Inc.
860 Gitts Run Road
Hanover PA 17331
United States

Telephone: (717) 632-1291
e-mail: info@aquaphoenixsci.com
Website: https://www.aquaphoenixsci.com/

e-mail (competent person): scraig@aquaphoenixsci.com (Stephen Craig)

1.4 Emergency telephone number

Emergency information service: ChemTel Inc.: 1-800-255-3924, +01-813-248-0585

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to GHS

This article does not meet the criteria for classification.

2.2 Label elements

Labeling

not required

2.3 Other hazards

Results of PBT and vPvB assessment

Does not contain a PBT-/vPvB-substance in a concentration of ≥ 0.1%.

Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) in a concentration of ≥ 0.1%.

Color Comparators for CHEMetrics Visual Analysis Kits

SECTION 3: Composition/information on ingredients

3.1 Substances

Not relevant (article)

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In all cases of doubt, or when symptoms persist, seek medical advice. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

Following inhalation

If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions. Provide fresh air.

Following skin contact

Wash with plenty of soap and water.

Following eye contact

Remove contact lenses, if present and easy to do. Continue rinsing. Irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart.

Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects are not known to date.

4.3 Indication of any immediate medical attention and special treatment needed

none

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water, Foam, ABC-powder

Unsuitable extinguishing media

Water jet

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO2)

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Coordinate firefighting measures to the fire surroundings. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Remove persons to safety.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases.

6.2 Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains, Take up mechanically

Advice on how to clean up a spill

Take up mechanically.

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Recommendations

Wear impact- and splash-resistant eyewear.

- Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation. Use only in well-ventilated areas. Ground/bond container and receiving equipment.

- Specific notes/details

Dust deposits may accumulate on all deposition surfaces in a technical room. The product in the delivered form is not dust explosion capable; the enrichment of fine dust however leads to the danger of dust explosion.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Managing of associated risks

- Explosive atmospheres

Removal of dust deposits.

Control of the effects

Protect against external exposure, such as

heat, high temperatures, light, UV-radiation/sunlight

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values (Workplace Exposure Limits)
this information is not available

8.2 Exposure controls

Appropriate engineering controls

General ventilation.

Individual protection measures (personal protective equipment)

Eye/face protection

Wear eye/face protection.

Skin protection

- Hand protection

Wear protective gloves.

- Other protection measures

Wash hands thoroughly after handling.

Respiratory protection

In case of inadequate ventilation wear respiratory protection.

Environmental exposure controls

Use appropriate container to avoid environmental contamination. Keep away from drains, surface and ground water.

Color Comparators for CHEMetrics Visual Analysis Kits

Version number: 11.0
SDS Identifier: VC1510SS

Revision: 2024-03-27

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Product description: Color Comparators: Series of color standards for visual colorimetric water analysis. Color standards are glass ampoules containing liquid reagent of gradients of color. Round (cylindrical) color comparators contain 8 color standards. Flat color comparators contain 9 color standards. Each CHEMet™ and VACUette™ color standard ampoule contains approximately 1.7 mL of liquid reagent sealed under vacuum. Each ULR CHEMet™ color standard ampoule contains approximately 6.7 mL of liquid reagent sealed under vacuum.

Physical state	solid (liquid-filled ampoule)
Color	various
Odor	odorless
Melting point/freezing point	not determined
Boiling point or initial boiling point and boiling range	not determined
Evaporation rate	not determined
Flammability	non-combustible
Lower and upper explosion limit	not determined
Flash point	not applicable
Auto-ignition temperature	not determined
Decomposition temperature	not relevant
pH (value)	not applicable
Kinematic viscosity	not relevant
Solubility(ies)	not determined

Partition coefficient

Partition coefficient n-octanol/water (log value)	this information is not available

Vapor pressure	not determined

Density and/or relative density

Density	not determined
Relative vapour density	information on this property is not available

Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Concerning incompatibility: see below "Conditions to avoid" and "Incompatible materials".

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

No known hazardous reactions.

10.4 Conditions to avoid

There are no specific conditions known which have to be avoided.

10.5 Incompatible materials

There is no additional information.

10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Acute toxicity

Shall not be classified as acutely toxic.

Skin corrosion/irritation

Shall not be classified as corrosive/irritant to skin.

Serious eye damage/eye irritation

Shall not be classified as seriously damaging to the eye or eye irritant.

Respiratory or skin sensitization

Shall not be classified as a respiratory or skin sensitizer.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

11.2 Information on other hazards

There is no additional information.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

12.2 Persistence and degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB. Does not contain a PBT-/vPvB-substance in a concentration of ≥ 0.1%.

12.6 Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) in a concentration of ≥ 0.1%.

12.7 Other adverse effects

Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1	**UN number**	not subject to transport regulations
14.2	**UN proper shipping name**	not relevant
14.3	**Transport hazard class(es)**	none
14.4	**Packing group**	not assigned
14.5	**Environmental hazards**	non-environmentally hazardous acc. to the dangerous goods regulations

14.6 Other relevant information

Shipping container markings and labels, received from CHEMetrics, may vary from the above information. Products that are regulated for transport will be packaged by CHEMetrics as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations. CHEMetrics may also elect to ship certain products as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III. In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

14.7 Maritime transport in bulk according to IMO instruments

The cargo is not intended to be carried in bulk.

Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT) - Additional information

Not subject to transport regulations.

International Maritime Dangerous Goods Code (IMDG) - Additional information

Not subject to IMDG.

International Civil Aviation Organization (ICAO-IATA/DGR) - Additional information

Not subject to ICAO-IATA.

Color Comparators for CHEMetrics Visual Analysis Kits

Version number: 11.0
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Revision: 2024-03-27

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

15.2 Chemical Safety Assessment

SECTION 16: Other information, including date of preparation or last revision

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
49 CFR US DOT	49 CFR U.S. Department of Transportation
DGR	Dangerous Goods Regulations (see IATA/DGR)
ED	Endocrine disruptor
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

Globally Harmonized System of Classification and Labelling of Chemicals ("Purple book").

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R9402

Version No.: 3.6

Product Name: Double-Tipped Ampoules for Detergents CHEMets® Kit and Refill and for Detergents Instrumental Test

Components of water analysis reagent sets: Refills R-9400, R-9423; and Kits I-2017, K-9400

Product Descriptions:

Double-Tipped Ampoules: Glass ampoules with dual tapered tips. Each double-tipped ampoule in K-9400 and R-9400 contains approximately 4 mL of liquid reagent. Each double-tipped ampoule in R-9423 contains approximately 9.5 mL of liquid reagent. Refills and test kits contain 20 double-tipped ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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4295 Catlett Road, Midland, VA 22728 ▪ P: 800.356.3072 ▪ F: 540.788.4856 ▪ www.chemetrics.com

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

CHEMetrics, Inc.

Chemwatch Hazard Alert Code:

Chemwatch: **9-87557**
SDS No: **R9402**
Version No: **3.6**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **03/02/2018**
Print Date: **03/02/2018**
Initial Date: **03/02/2018**
S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test
Synonyms	Not Available
Proper shipping name	Chemical kits; First aid kits
Chemical formula	Not Applicable
Other means of identification	Not Available
CAS number	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Component of water analysis reagent sets: Refills R-9400, R-9423 and Kits I-2017, K-9400

Details of the supplier of the safety data sheet

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland VA 22728 - United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency telephone number

Association / Organisation	ChemTel, Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification	Acute Toxicity (Oral) Category 4, Acute Toxicity (Inhalation) Category 3, Skin Corrosion/Irritation Category 2, Serious Eye Damage Category 1, Carcinogenicity Category 2, Reproductive Toxicity Category 2, Specific target organ toxicity - repeated exposure Category 2

Label elements

Hazard pictogram(s)	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H302	Harmful if swallowed.
H331	Toxic if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Continued...

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P310	Immediately call a POISON CENTER or doctor/physician.
P362	Take off contaminated clothing and wash before reuse.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P330	Rinse mouth.
P332+P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-66-3	71	chloroform
7732-18-5	26	water
13472-35-0	2	sodium phosphate, monobasic, dihydrate
7664-93-9	1	sulfuric acid
61-73-4	<0.1	methylene blue
Not Available	<0.1	Proprietary ingredient

SECTION 4 FIRST AID MEASURES

Description of first aid measures

General	
Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	NOTE: IN massive chloroform overdose,DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration If poisoning occurs, contact a doctor or Poisons Information Centre. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Continued...

- If swallowed do **NOT** induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

For chloroform intoxications:
Chloroform concentrations may be determined in blood.
Treat irritation symptomatically.
Oral Management:
Chloroform is radiopaque and X-rays confirm ingestion.
DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration.
Consider gastric lavage within 1 hour of ingestion because of very rapid absorption of chloroform (use cuffed ET tube to protect airway)
Contact a poisons information service for further guidance on gut decontamination.
Systematic Management.
All patients initially require at least 24 hours observation with ECG monitoring.
Patients should be kept at complete bed rest, the use of stimulants (including adrenaline and noradrenaline) should be avoided because of the risk of sensitisation of the myocardium.
In symptomatic patients the hepatic and renal function should be monitored for at least 3-days post-exposure.
Chest X-rays will be necessary to monitor development of respiratory complications.
Chloroform depletes glutathione stores; N-acetylcysteine (used in the treatment of paracetamol overdose) has been suggested as a possible antidote for hepatotoxic organic solvents (success in carbon tetrachloride intoxications has been reported).
for intoxication due to Freons/ Halons;
A: Emergency and Supportive Measures
- Maintain an open airway and assist ventilation if necessary
- Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:
- There is no specific antidote

C: Decontamination
- Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:
- There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition
- Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- No specific antidote.
- Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- If lavage is performed, suggest endotracheal and/or esophageal control.
- Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- Treatment based on judgment of the physician in response to reactions of the patient

For acute or short term repeated exposures to strong acids:
- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:
- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- **DO NOT** attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:
- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:
- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjuctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT** use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Continued...

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use fire fighting procedures suitable for surrounding area. ▸ **DO NOT** approach containers suspected to be hot. ▸ Cool fire exposed containers with water spray from a protected location. ▸ If safe to do so, remove containers from path of fire. ▸ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	▸ Non combustible. ▸ Not considered to be a significant fire risk. ▸ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ May emit corrosive, poisonous fumes. May emit acrid smoke. carbon dioxide (CO_2) hydrogen chloride phosgene other pyrolysis products typical of burning organic material. May emit poisonous fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Water spray or fog may be used to disperse / absorb vapour. ▸ Contain or absorb spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▸ If contamination of drains or waterways occurs, advise emergency services.

	Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ **DO NOT** allow material to contact humans, exposed food or food utensils. ▸ Avoid contact with incompatible materials. ▸ When handling, **DO NOT** eat, drink or smoke. ▸ Keep containers securely sealed when not in use. ▸ Avoid physical damage to containers. ▸ Always wash hands with soap and water after handling. ▸ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▸ Use good occupational work practice. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. ▸ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. **Wear impact- and splash-resistant eyewear.**
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS. **For optimum analyical performance, store in the dark and at room temperature.**

Conditions for safe storage, including any incompatibilities

Suitable container	▸ **DO NOT** use aluminium or galvanised containers ▸ Lined metal can, lined metal pail/ can. ▸ Plastic pail. ▸ Polyliner drum. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.

Continued...

	For low viscosity materials ▸ Drums and jerricans must be of the non-removable head type. ▸ Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.): ▸ Removable head packaging; ▸ Cans with friction closures and ▸ low pressure tubes and cartridges may be used. - Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *. - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.
Storage incompatibility	Chloroform ▸ decomposes in the presence of excess water, high temperature, including hot surfaces, evolving phosgene and hydrogen chloride ▸ on contact with warm water may form hydrogen chloride ▸ decomposes at ordinary temperatures in sunlight, in the absence of air, and in the dark in the presence of air ▸ may form explosive materials when mixed with strong bases, alkali metals, lithium, sodium, potassium, sodium-potassium alloys; these may be heat-, friction-, and/or impact sensitive ▸ reacts violently with light metals, aluminium, magnesium or titanium powder, disilane, potassium tert-butoxide, methylates (methoxides), potassium acetylene-1,2-dioxide, sodium amide, uranium(III) hydride ▸ reacts violently with (acetone + a base), (perchloric acid + phosphorous pentoxide), (KOH + methanol) and (NaOH + methanol). ▸ is incompatible with acetone, beryllium, decaborane, methanol, nitrogen tetroxide, strong oxidisers, fluorine, oxygen, potassium, sodium, strong mineral acids, triisopropylphosphine, chemically active metals (Li, NaK alloy), zinc ▸ attacks many plastics and rubber ▸ attacks iron and other metals in the presence of moisture and elevated temperatures ▸ may generate electrostatic charges due to low conductivity Haloalkanes: ▸ are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results. ▸ may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents. ▸ may produce explosive compounds following prolonged contact with metallic or other azides ▸ may react on contact with potassium or its alloys - although apparently stable on contact with a wide rage of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures . BRETHERICK L.: Handbook of Reactive Chemical Hazards ▸ react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li),calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys. ▸ may react with brass and steel. ▸ may react explosively with strong oxidisers ▸ may degrade rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene, paint and coatings ▸ Avoid strong bases.

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US NIOSH Recommended Exposure Limits (RELs)	chloroform	Methane trichloride, Trichloromethane	Not Available	9.78 mg/m3 / 2 ppm	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	chloroform	Chloroform	10 ppm	Not Available	Not Available	TLV® Basis: Liver & embryo/fetal dam; CNS impair
US OSHA Permissible Exposure Levels (PELs) - Table Z1	chloroform	Chloroform (Trichloromethane)	Not Available	Not Available	240 mg/m3 / 50 ppm	Not Available
US NIOSH Recommended Exposure Limits (RELs)	sulfuric acid	Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous)	1 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	sulfuric acid	Sulfuric acid	0.2 mg/m3	Not Available	Not Available	TLV® Basis: Pulm func
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sulfuric acid	Sulfuric acid	1 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
chloroform	Chloroform	2 ppm	Not Available	Not Available
sulfuric acid	Sulfuric acid	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
chloroform	500 ppm	Not Available
water	Not Available	Not Available

Continued...

sodium phosphate, monobasic, dihydrate	Not Available	Not Available
sulfuric acid	15 mg/m3	Not Available
methylene blue	Not Available	Not Available
Proprietary ingredient	Not Available	Not Available

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection.
Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.
An approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Personal protection

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

Skin protection

See Hand protection below

Hands/feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber

Body protection

See Other protection below

Other protection

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

Thermal hazards

Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:

Respiratory protection

Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
Degree of protection varies with both face-piece and Class of filter; the nature of protection

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
TEFLON	C
VITON	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AB-AUS P2	-	AB-PAPR-AUS / Class 1 P2
up to 50 x ES	-	AB-AUS / Class 1 P2	-
up to 100 x ES	-	AB-2 P2	AB-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Two phase: Blue / Colorless

Physical state	Liquid	**Relative density (Water = 1)**	1.49 (chloroform layer)
Odour	Characteristic	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	1.35 (aqueous layer)	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Partly miscible	**pH as a solution**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Continued...

Inhaled	Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Exposure to vapours of some rare earth salts can cause sensitivity to heat, itching, and increased sensitivity of smell and taste. Other effects include inflamed airways and lung, emphysema, regional narrowing of terminal airways and cell changes. Chloroform concentrations of 1000-2000 parts per million (ppm) may cause dizziness, headache, fatigue, salivation and nausea. 4000 ppm may cause vomiting, serious disorientation and a fainting feeling. 14000-16000 ppm may cause rapid loss of consciousness. More than 20000 ppm may cause breathing failure, heart rhythm disturbances and death. If death does not immediately occur from stoppage of breathing or heart beat, it may occur later from liver and kidney damage. Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved. Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin)
Ingestion	The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum. Symptoms of chloroform ingestion include burning of the mouth, throat, gullet and stomach; diarrhoea and abdominal/lower chest pain; cold, clammy skin, blueness of the extremities and face, muscle cramps, dilated pupils, low blood pressure, blood vessel dilatation on the periphery, irregular breathing, respiratory failure, unconsciousness and liver damage. Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.
Skin Contact	The material may accentuate any pre-existing dermatitis condition Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.
Eye	If applied to the eyes, this material causes severe eye damage. Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.
Chronic	Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility. Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Long term exposure to chloroform may produce dizziness, fatigue, drowsiness, memory impairment, increased dreams, loss of appetite, palpitations, liver and kidney damage. There may be depression, confusion, negative changes in behaviour and passive mood states. Chronic abuse of chloroform may cause psychotic behaviour. Repeated exposure may also cause dullness, urinary frequency, gastrointestinal disturbances, dry mouth, thirst, headache, general unwellness, blurred vision, pins and needles, loss of sense of balance, tremors, memory and anaemia. It may be dangerous to the foetus (unborn baby). It has been shown to induce liver, kidney, intestinal and urinary bladder tumours, including cancer.

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	**TOXICITY**	**IRRITATION**

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	**TOXICITY**	**IRRITATION**

CHLOROFORM	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [*National Toxicology Program: U.S. Dep. of Health & Human Services 2002*]
WATER	No significant acute toxicological data identified in literature search.
SODIUM PHOSPHATE, MONOBASIC, DIHYDRATE	Data for anhydride
SULFURIC ACID	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.

Continued...

	WARNING: For inhalation exposure ONLY: This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS** Occupational exposures to strong inorganic acid mists of sulfuric acid:
METHYLENE BLUE	The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing. After i.v. administration Methylene Blue may cause nausea, vomiting, abdominal and chest pain, headache, dizziness, mental confusion, profuse sweating, and hypertension; with very high doses methaemoglobinemia and ahemolysis may occur. Methylene Blue activates a normally dormant reductase enzyme system which reduces the methylene blue to leucomethylene blue, which in turn is able to reduce methaemoglobin to haemoglobin. Methylene Blue is absorbed from the gastrointestinal tract. It is believed to be reduced in the tissues to the leuco form which is slowly excreted, mainly in the urine together with some unchanged drug. Methylene Blue imparts a blue color to urine and faeces. In large doses Methylene Blue can produce methaemoglobinaemia. Although intra-amniotic injection of Methylene Blue has been used to diagnose premature rupture of fetal membranes or to identify separate amniotic sacs in twin pregnancies, there have been several reports of hemolytic anemia (Heinz-body anemia) and hyperbilirubinemia in neonates exposed to Methylene Blue in the amniotic cavity. In most cases, exchange transfusions and/or phototherapy are required to control the jaundice. Methylene Blue should be used with caution in the treatment of toxic methemoglobinemia; high doses can cause hemolytic anemias and patients with glucose-6-phosphate dehydrogenase (G6PD) deficiencies are particularly susceptible. A rapid disappearance of cyanosis in response to Methylene Blue would be expected within one hour but might not occur if the patient has erythrocyte G6PD or NADPH-diaphorase deficiency or if methemoglobinemia is due to the ingestion of compounds such as aniline or dapsone. A second dose has been recommended if cyanosis does not disappear within 1 hour of Methylene Blue administration but results of a study in animals and of a patient with aniline poisoning indicated that an increased dosage of Methylene Blue might be of no additional benefit and could be potentially dangerous in that it could enhance Heinz body formation. Methylene Blue should not be injected s.c. as it may cause necrotic abscesses. It should not be given by intrathecal injection as neural damage has occurred. Methylene Blue should be used with caution in patients with glucose-6-phosphate dehydrogenase deficiency.

Acute Toxicity	✔	**Carcinogenicity**	✔
Skin Irritation/Corrosion	✔	**Reproductivity**	✔
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	✔
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✔ *– Data available to make classification*
✘ *– Data available but does not fill the criteria for classification*
⊘ *– Data Not Available to make classification*

CMR STATUS

Not Applicable

REPROTOXIN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
CARCINOGEN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
MUTAGEN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
EYE	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
RESPIRATORY	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
SKIN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

NOT AVAILABLE

Ingredient	Endpoint	Test Duration (hr)	Effect	Value	Species	BCF
Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
chloroform	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
water	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sodium phosphate, monobasic, dihydrate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sulfuric acid	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
methylene blue	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

For Haloalkanes:
Atmospheric Fate: Fully, or partially, fluorinated haloalkanes released to the air can restrict heat loss from the Earth's atmosphere by absorbing infrared emissions from the surface. The major fate of haloalkanes in the atmosphere is via breakdown by hydroxyl radicals. These substances react with atmospheric ozone and nitrates, which also causes them to change, (transform). Chlorofluorocarbons, (CFC), haloalkanes can break down into chlorine atoms in the air, which also contribute to ozone destruction.
Terrestrial Fate: Biological breakdown of these substances is expected to be faster than non-biological breakdown, provided that there are sufficient substrates, nutrients and microbial populations. However, because haloalkane-degrading microorganisms are not easily found, biological breakdown of these substances is rare. Several methane-utilizing bacteria have been identified that may use haloalkanes. Biological breakdown may occur through various pathways.
Aquatic Fate: Haloalkanes do not easily break down in water. Biological breakdown of these substances is expected to be faster than non-biological breakdown, provided that there are sufficient substrates, nutrients and microbial populations. In general, alpha- and alpha, omega-chlorinated haloalkanes are de-halogenated by water. Alpha- and alpha, omega-haloalkanes with longer chains, may be de-halogenated by the addition of oxygen, (oxidized). Haloalkanes may break down in water, if certain sulfur ions are present, such as bisulfide ions.

Continued...

Ecotoxicity: Haloparaffins C12 to C18 may be incorporated into fatty acids in bacteria, yeasts, and fungi, resulting in their build up in the food chain. Haloalkanes are persistent and toxic to fish and wildlife.

Ecotoxicity:
The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5
For Chloroform:
log Kow: 1.97; Koc: 34; Half-life (hr) air: 1920; Half-life (hr) H2O surface water: 28 744; Henry's atm m3/mol: 4.35E-03; BOD 5: 0.02; ThOD: 0.33,1.346; BCF: 1.9-10.35. Drinking Water Standard - Hydrocarbon total: 10 ug/l (UK max.); Chloroform: 200 ug/l (WHO guideline); Soil Guidelines - Dutch criteria: 0.001 mg/kg.
Atmospheric Fate: Chloroform will generally evaporate to atmosphere; however, transportation may occur over long distances and photo-oxidization will occur (half-life 80 days). Chloroform is expected to exist almost entirely in the vapor phase in the atmosphere. Large amounts of chloroform in the atmosphere may be removed during precipitation; however, most chloroform removed in precipitation is likely to re-enter the atmosphere by volatilization. Long-range atmospheric transport of chloroform is possible. The major degradation process in the air involves reactions with free radicals such as hydroxyl groups. Breakdown products include phosgene and hydrogen chloride. Chloroform is more reactive in photochemical smog conditions where the approximate half-life is 11 days.
Aquatic Fate: Direct photolysis of chloroform will not be a significant degradation process in surface waters and the dominant fate process for chloroform in surface waters is volatilization. Chloroform present in surface water is expected to volatilize rapidly to the atmosphere. A half-life of 44 hours for volatilization has been estimated.
Terrestrial Fate: Spills and releases on land will evaporate quickly or leach into groundwater where they persist for long periods. Chloroform is not expected to adsorb significantly to sediment or suspended organic matter in surface waters. In soil, the dominant transport mechanism for chloroform near the surface will probably be volatilization with relatively constant rates over a wide variety of soil types.
Ecotoxicity: Chloroform is not expected to concentrate in the food chain. Chloroform does not appear to bioconcentrate in higher aquatic organisms including bluegill sunfish but, has a moderate tendency to concentrate in nonvascular aquatic plants such as green algae. Significant degradation of chloroform under aerobic conditions has been reported in tests. Under the proper conditions, chloroform appears to be much more susceptible to anaerobic biodegradation. Above certain dosage levels, chloroform becomes toxic to anaerobic and aerobic microorganisms. This is especially noticeable for biological treatment facilities that use anaerobic digestion systems, where sustained inputs with chloroform concentrations approaching 100 mg/L can all but eliminate methane fermenting bacteria.
For Cerium:
Environmental Fate: Despite their name, rare earth elements are relatively plentiful in the Earth's crust, with cerium being the 25th most abundant element. Cerium compounds include cerium oxide, cerium carbonate, and cerium chloride.
Atmospheric Fate: Cerium oxidizes very readily at room temperature, especially in moist air. Except for europium, cerium is the most reactive of the rare-earth metals.
Terrestrial Fate: Soil ◆ Cerium is found in minerals including allanite, monazite, cerite, and bastnaesite. Plants ◆ Crops can take up cerium.
Aquatic Fate: Cerium oxide and cerium carbonate are insoluble in water, while cerium chloride is soluble in water. Cerium has affinity for humic substances, which may alter its availability in aquatic systems. The substance slowly decomposes in cold water, and rapidly decomposes in hot water. Alkali solutions and dilute/concentrated acids attack the metal rapidly.
Ecotoxicity: Current fate and transport studies are limited and may not adequately address long term environmental exposure risks to both humans and other living organisms. Although cerium has low acute toxicity, long term health and environmental effects are less well understood. The form cerium takes can also influence its biological and environmental fate. Oxides and hydroxides of cerium are poorly soluble in body fluids thus are slow to clear from the organism. Cerium can affect the respiratory tract and associated lymph nodes, (inhalation exposure), and, once in the circulatory system, can partition to the skeleton, liver, kidney and spleen. Studies subjecting animals to large dosages of cerium show evidence of neurological effects, possibly due to cerium competing with calcium binding sites in the brain. Long term human expose to cerium is correlated with rare earth pneumoconiosis, but, the precise role of cerium in this disease is not well characterized.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
chloroform	HIGH (Half-life = 1800 days)	HIGH (Half-life = 259.63 days)
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
chloroform	LOW (BCF = 13)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
chloroform	LOW (KOC = 35.04)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ ▸ ▸ **Dispose of according to federal, state, and local regulations.** ▸

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Continued...

Land transport (DOT)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kits; First aid kits
Environmental hazard	No relevant data
Transport hazard class(es)	Class: 9
Special precautions for user	Hazard Label: 9 Special provisions: 15

Air transport (ICAO-IATA / DGR)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kit; First aid kit
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class: 9 ICAO / IATA Subrisk: Not Applicable ERG Code: 9L
Special precautions for user	Special provisions: A44 A163 Cargo Only Packing Instructions: 960 Cargo Only Maximum Qty / Pack: 10 kg Passenger and Cargo Packing Instructions: 960 Passenger and Cargo Maximum Qty / Pack: 10 kg Passenger and Cargo Limited Quantity Packing Instructions: Y960 Passenger and Cargo Limited Maximum Qty / Pack: 1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3316
Packing group	II
UN proper shipping name	CHEMICAL KIT or FIRST AID KIT
Environmental hazard	Not Applicable
Transport hazard class(es)	IMDG Class: 9 IMDG Subrisk: Not Applicable
Special precautions for user	EMS Number: F-A , S-P Special provisions: 251 340 Limited Quantities: See SP251

Transport in bulk according to Annex II of MARPOL and the IBC code

Source	Ingredient	Pollution Category
	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

chloroform(67-66-3) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US - Alaska Limits for Air Contaminants","US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens","US - California Proposition 65 - Reproductive Toxicity","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts - Right To Know Listed Chemicals","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Priority Pollutants","US CWA (Clean Water Act) - Toxic Pollutants","US EPA Carcinogens Listing","US EPCRA Section 313 Chemical List","US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US National Toxicology Program (NTP) 14th Report Part B. Reasonably Anticipated to be a Human Carcinogen","US NIOSH Recommended Exposure Limits (RELs)","US Office of Environmental Health Hazard Assessment Proposition 65 No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity","US

Continued...

	OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances","US TSCA New Chemical Exposure Limits (NCEL)"
water(7732-18-5) is found on the following regulatory lists	"US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances"
sodium phosphate, monobasic, dihydrate(13472-35-0) is found on the following regulatory lists	"US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances"
sulfuric acid(7664-93-9) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft","US - Alaska Limits for Air Contaminants","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts - Right To Know Listed Chemicals","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CWA (Clean Water Act) - List of Hazardous Substances","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US EPCRA Section 313 Chemical List","US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Chemical Substance Inventory - Interim List of Active Substances"
methylene blue(61-73-4) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"
Proprietary ingredient() is found on the following regulatory lists	"Not Applicable"

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
Not Available	Not Available

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R1001

Version No.: 2.2

Product Name: CHEMets® Ampoules for Filming Amines CHEMets® Kit & Refill (R-1001) and for Detergents CHEMets® Kit & Refill (R-9401)

Component of water analysis reagent sets: Refills R-1000, R-1000E, R-9400, R-9404 and Test Kits K-1001, K-1001E, K-9400, K-9404

Product Descriptions:

CHEMets Ampoules: Sealed glass ampoules, 7 mm OD, for visual colorimetric water analysis. Each CHEMet™ ampoule contains approximately 0.25 mL of liquid reagent sealed under vacuum. The refills and kits contain 20 CHEMets ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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4295 Catlett Road, Midland, VA 22728 ▪ P: 800.356.3072 ▪ F: 540.788.4856 ▪ www.chemetrics.com

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

CHEMetrics, Inc.

Chemwatch Hazard Alert Code: **3**

Chemwatch: **9-92655**
SDS No: **R1001**
Version No: **2.2**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **03/11/2014**
Print Date: **12/03/2015**
Initial Date: **05/11/2014**
S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)
Synonyms	Not Available
Proper shipping name	Chemical kits|First aid kits
Chemical formula	Not Applicable
Other means of identification	Not Available
CAS number	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Component of water analysis reagent sets: refills R-1000, R-1000E, R-9400, R-9404 and test kits K-1001, K-1001E, K-9400, K-9404

Details of the manufacturer/importer

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland, VA. 22728 United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency telephone number

Association / Organisation	ChemTel Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification	Flammable Liquid Category 3, Serious Eye Damage Category 1, STOT - SE (Narcosis) Category 3

Label elements

GHS label elements	
SIGNAL WORD	**DANGER**

Hazard statement(s)

H226	Flammable liquid and vapour
H318	Causes serious eye damage
H336	May cause drowsiness or dizziness

Precautionary statement(s) Prevention

Continued...

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P240	Ground/bond container and receiving equipment.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor/physician/first aider
P370+P378	In case of fire: Use alcohol resistant foam or fine spray/water fog for extinction.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
71-23-8	98	n-propanol
7732-18-5	2	water

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. ▸ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Indication of any immediate medical attention and special treatment needed

To treat poisoning by the higher aliphatic alcohols (up to C7):

- Gastric lavage with copious amounts of water.
- It may be beneficial to instill 60 ml of mineral oil into the stomach.
- Oxygen and artificial respiration as needed.
- Electrolyte balance: it may be useful to start 500 ml. M/6 sodium bicarbonate intravenously but maintain a cautious and conservative attitude toward electrolyte replacement unless shock or severe acidosis threatens.
- To protect the liver, maintain carbohydrate intake by intravenous infusions of glucose.
- Haemodialysis if coma is deep and persistent. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, Ed 5)

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for shock.
- Monitor and treat, where necessary, for pulmonary oedema.
- Anticipate and treat, where necessary, for seizures.

Continued...

- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- Give activated charcoal.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- If the patient is hypoglycaemic (decreased or loss of consciousness, tachycardia, pallor, dilated pupils, diaphoresis and/or dextrose strip or glucometer readings below 50 mg), give 50% dextrose.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- Acidosis may respond to hyperventilation and bicarbonate therapy.
- Haemodialysis might be considered in patients with severe intoxication.
- Consult a toxicologist as necessary. BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For C8 alcohols and above.
Symptomatic and supportive therapy is advised in managing patients.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

	▸ Alcohol stable foam. ▸ Dry chemical powder. ▸ BCF (where regulations permit). ▸ Carbon dioxide. ▸ Water spray or fog - Large fires only.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area. ▸ Avoid spraying water onto liquid pools.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). ▸ May emit acrid smoke.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb small quantities with vermiculite or other absorbent material.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course.

	Personal Protective Equipment advice is contained in Section 8 of the MSDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked.

Continued...

	Wear impact- and splash-resistant eyewear. Break the ampoule tip only when it is completely immersed in sample. Breaking the tip in air may cause the glass ampoule to shatter.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. **For optimum analytical performance, store in the dark and at room temperature.**

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	Alcohols ▸ are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. ▸ reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen ▸ react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzincs, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium ▸ should not be heated above 49 deg. C. when in contact with aluminium equipment

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	n-propanol	n-Propyl alcohol	500 mg/m3 / 200 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	n-propanol	n-Propanol (n-Propyl alcohol)	100 ppm	Not Available	Not Available	TLV® Basis: Eye & URT irr
US NIOSH Recommended Exposure Limits (RELs)	n-propanol	Ethyl carbinol, 1-Propanol, n-Propanol, Propyl alcohol	500 mg/m3 / 200 ppm	625 mg/m3 / 250 ppm	Not Available	[skin]

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
n-propanol	Propyl alcohol, n-; (n-Propanol)	250 ppm	250 ppm	4000 ppm

Ingredient	Original IDLH	Revised IDLH
n-propanol	4,000 ppm	800 ppm
water	Not Available	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and.has to be observed when making a final choice. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: ▸ frequency and duration of contact, ▸ chemical resistance of glove material, ▸ glove thickness and ▸ dexterity

Continued...

	Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C. apron. ▸ Barrier cream. ▸ Skin cleansing cream.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

Material	CPI
NEOPRENE	A
VITON	B
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PVA	C
PVC	C
TEFLON	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.
Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	Air-line*	A-2	A-PAPR-2 ^
up to 20 x ES	-	A-3	-
20+ x ES	-	Air-line**	-

* - Continuous-flow; ** - Continuous-flow or positive pressure demand
^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	colorless, may contain black particles

Physical state	Liquid	**Relative density (Water = 1)**	0.8
Odour	Characteristic	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	413
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	-127	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	97	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	23	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Flammable.	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	13.5	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	2.1	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution**	8.5
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7

Continued...

Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Subjects unacclimatised to n-propanol exposure experienced mild irritation of the eyes, nose and throat at a concentration of 400 parts per million.
Ingestion	Overexposure to non-ring alcohols causes nervous system symptoms. These include headache, muscle weakness and inco-ordination, giddiness, confusion, delirium and coma. The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. The calculated human skin permeability coefficient for n-propanol by the U.S. Environment Protection Agency is 1.3 x 10-3 cm/hr. Most liquid alcohols appear to act as primary skin irritants in humans. Significant percutaneous absorption occurs in rabbits but not apparently in man.
Eye	If applied to the eyes, this material causes severe eye damage.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. N-propanol is shown to cause dose dependent severe liver injury, malignant tumours (blood and liver cancers) and benign tumours in rats. There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	**TOXICITY**	**IRRITATION**
CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	**TOXICITY**	**IRRITATION**

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	No significant acute toxicological data identified in literature search. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	✔
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✔ *– Data required to make classification available*
✘ *– Data available but does not fill the criteria for classification*
⊘ *– Data Not Available to make classification*

CMR STATUS

SKIN	n-propanol	US - Hawaii Air Contaminant Limits - Skin Designation|US NIOSH Recommended Exposure Limits (RELs) - Skin|US - Washington Permissible exposure limits of air contaminants - Skin|US - California Permissible Exposure Limits for Chemical Contaminants - Skin	X|[skin]|S

Continued...

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

For n-Propanol: log Kow: 0.25-0.34;
Half-life (hr) air: 6.7;
Half-life (hr) H2O surface water: 6.5;
Henry's atm m3 /mol: 6.85E-06;
BOD 5: 1.43-1.6 g O2/g;
BOD 20: <2 g O2/g;
COD : 91%;
ThOD : 1.8 g;
O2/gBCF: 0.7.
Aquatic Fate: High biochemical oxygen demand and a potential to cause oxygen depletion in aqueous systems, a low potential to affect aquatic organisms, a low potential to affect secondary waste treatment microbial metabolism. n-Propanol is expected to biodegrade and is not expected to persist for long periods in aquatic environments. When diluted with a large amount of water, n-propanol is not expected to have a significant impact.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
n-propanol	LOW	LOW
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
n-propanol	LOW (LogKOW = 0.25)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
n-propanol	HIGH (KOC = 1.325)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	**Dispose of according to federal, state, and local regulations.**

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO

Land transport (DOT)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kits; First aid kits
Environmental hazard	No relevant data
Transport hazard class(es)	Class | 9
Special precautions for user	Special provisions | 15

Air transport (ICAO-IATA / DGR)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kit †; First aid kit †
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class | 9 ICAO / IATA Subrisk | Not Applicable ERG Code | 9L

Continued...

Special precautions for user	Special provisions	A44 A163
	Cargo Only Packing Instructions	960
	Cargo Only Maximum Qty / Pack	10 kg
	Passenger and Cargo Packing Instructions	960
	Passenger and Cargo Maximum Qty / Pack	10 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y960
	Passenger and Cargo Limited Maximum Qty / Pack	1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3316
Packing group	II
UN proper shipping name	CHEMICAL KIT or FIRST AID KIT
Environmental hazard	Not Applicable
Transport hazard class(es)	IMDG Class: 9 IMDG Subrisk: Not Applicable
Special precautions for user	EMS Number: F-A , S-P Special provisions: 251 340 Limited Quantities: See SP251

Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	n-propanol	Y

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

n-propanol(71-23-8) is found on the following regulatory lists	"US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Idaho - Limits for Air Contaminants","US - Hawaii Air Contaminant Limits","US - California Permissible Exposure Limits for Chemical Contaminants","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Oregon Permissible Exposure Limits (Z-1)","US - Michigan Exposure Limits for Air Contaminants","US NIOSH Recommended Exposure Limits (RELs)","US - Alaska Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US ACGIH Threshold Limit Values (TLV)","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US OSHA Permissible Exposure Levels (PELs) - Table Z1"
water(7732-18-5) is found on the following regulatory lists	"US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name DPD Free Chlorine Reagent

Other means of identification
Product Code(s) 2105569

Safety data sheet number M00109

HMRIC # HMIRA Registry Number 9935 Filed 2021-03-29

Recommended use of the chemical and restrictions on use
Recommended Use Water Analysis. Determination of chlorine.
Uses advised against Consumer use.
Restrictions on use Please refer to the product labeling and packaging for information about appropriate use.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company, P.O.Box 389, Loveland, CO 80539, USA, +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Serious eye damage/eye irritation	Category 2A
Specific target organ toxicity (repeated exposure)	Category 2

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word
Warning

Hazard statements
H319 - Causes serious eye irritation
H373 - May cause damage to organs through prolonged or repeated exposure

Precautionary statements
P280 - Wear protective gloves, protective clothing, eye protection, and face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical attention
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P314 - Get medical advice/attention if you feel unwell
P501 - Dispose of contents/ container to an approved waste disposal plant

Other Hazards Known
None

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Not applicable

Mixture

Chemical Family Mixture.
Chemical nature No information available.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Carboxylate Salt	-	60 - 70%	-
Phosphoric acid, disodium salt	7558-79-4	30 - 40%	-
Salt of N,N-Diethyl-p-Phenylenediamine	-	1 - 5%	-
Disodium EDTA	139-33-3	1 - 5%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance.

Inhalation Remove to fresh air.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get medical attention if irritation develops and persists.

Skin contact Wash skin with soap and water.

Ingestion Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician.

Self-protection of the first aider Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms Burning sensation.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical No information available.

Hazardous combustion products Carbon monoxide, Carbon dioxide. Phosphorus oxides. Nitrogen oxides.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Avoid contact with skin, eyes or clothing.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Take up mechanically, placing in appropriate containers for disposal.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems. Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves. Gloves must be inspected prior to use. The selected protective gloves have to satisfy the specifications of EU Directive 2016/425 and the standard EN 374 derived from it. Chemical resistant gloves made of butyl rubber or nitrile rubber category III according to EN 374-1:2016. Barrier creams may help to protect the exposed areas of skin.

Eye/face protection If splashes are likely to occur, wear safety glasses with side-shields.

Skin and body protection Wear suitable protective clothing. Avoid contact with eyes, skin and clothing. Wash contaminated clothing before reuse.

General Hygiene Considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid		
Appearance	powder	**Color**	White to light pink White to brown
Odor	Odorless	**Odor threshold**	No data available

Property	**Values**	**Remarks • Method**
Molecular weight	No data available	
pH	6.35	1% @ 20°C
Melting point / freezing point	110 °C / 230 °F	
Initial boiling point and boiling range	No data available	

Evaporation rate	Not applicable
Vapor pressure	Not applicable
Relative vapor density	No data available
Specific gravity - VALUE 1	1.76
Partition coefficient	log K_{ow} ~ 0
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ 0
Autoignition temperature	No data available
Decomposition temperature	110 °C / 230 °F
Dynamic viscosity	Not applicable
Kinematic viscosity	Not applicable

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Completely soluble	> 10000 mg/L	25 °C / 77 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other information

Corrosive to metals

Steel Corrosion Rate	No data available
Aluminum Corrosion Rate	No data available

Volatile Organic Compounds (VOC) Content
Not applicable

Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Carboxylate Salt	-	No data available	-
Phosphoric acid, disodium salt	7558-79-4	No data available	-
Salt of N,N-Diethyl-p-Phenylenediamine	-	Not applicable	-
Disodium EDTA	139-33-3	No data available	-

Explosive properties

Upper explosion limit	No data available
Lower explosion limit	No data available

Flammable properties

Flash point	Not applicable

Flammability Limit in Air
Upper flammability limit: No data available
Lower flammability limit: No data available

Oxidizing properties No data available.

Bulk density No data available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
None under normal processing.

Conditions to avoid
None known based on information supplied.

Incompatible materials
Strong oxidizing agents, strong acids, and strong bases.

Hazardous decomposition products
Carbon dioxide. Carbon monoxide. Phosphorus oxides. Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation	May cause irritation of respiratory tract.
Eye contact	Causes serious eye irritation. May cause redness, itching, and pain.
Skin contact	May cause irritation. Prolonged contact may cause redness and irritation.
Ingestion	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Symptoms	May cause redness and tearing of the eyes.

Acute toxicity
Based on available data, the classification criteria are not met

Mixture
No data available.

Ingredient Acute Toxicity Data

Test data reported below.

Oral Exposure Route

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Salt of N,N-Diethyl-p-Phenylenediamine (1 - 5%) CAS#: -	Rat LD_{50}	695 mg/kg	None reported	None reported	Outside testing
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Rat LD_{50}	2000 mg/kg	None reported	None reported	RTECS

Inhalation (Dust/Mist) Exposure Route

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	None reported	Estimated	None reported	None reported	No information available

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	21,786.80 mg/kg
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	136.40 mg/l
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Skin corrosion/irritation
Based on available data, the classification criteria are not met.

Mixture
No data available.

Ingredient Skin Corrosion/Irritation Data
Test data reported below.

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Standard Draize Test	Rabbit	500 mg	20 hours	Not corrosive or irritating to skin	ECHA

Serious eye damage/irritation
Classification based on data available for ingredients. Irritating to eyes.

Mixture
No data available.

Ingredient Eye Damage/Eye Irritation Data
Test data reported below.

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Standard Draize Test	Rabbit	50 mg	None reported	Mild eye irritant	ECHA

Respiratory or skin sensitization
Based on available data, the classification criteria are not met.

Mixture
No data available.

Ingredient Sensitization Data
No data available.

STOT - single exposure
Based on available data, the classification criteria are not met.

Mixture
No data available.

Ingredient Specific Target Organ Toxicity Single Exposure Data
No data available.

STOT - repeated exposure
May cause damage to organs.

Mixture
No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data
No data available.

Carcinogenicity
Based on available data, the classification criteria are not met.

Mixture
No data available.

Ingredient Carcinogenicity Data
No data available.

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Carboxylate Salt	-	-	-	-	-
Phosphoric acid, disodium salt	7558-79-4	-	-	-	-
Salt of N,N-Diethyl-p-Phenylenediamine	-	-	-	-	-
Disodium EDTA	139-33-3	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA	Does not apply

Germ cell mutagenicity
Based on available data, the classification criteria are not met.

Mixture *invitro* **Data**
No data available.

Substance *invitro* **Data**
Test data reported below.

Chemical name	Test	Cell Strain	Reported dose	Exposure time	Results	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Cytogenetic analysis	Hamster lung	200 mg/L	None reported	Positive test result for mutagenicity	RTECS

Mixture *invivo* **Data**
No data available.

Substance *invivo* **Data**
No data available.

Reproductive toxicity
Based on available data, the classification criteria are not met.

Mixture
No data available.

Ingredient Reproductive Toxicity Data
No data available.

Aspiration hazard
Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

Ecotoxicity Based on available data, the classification criteria are not met.

Unknown aquatic toxicity 0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Mixture

Aquatic Acute Toxicity
No data available.

Aquatic Chronic Toxicity
No data available.

Substance

Aquatic Acute Toxicity
Test data reported below.

Fish

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	96 hours	*Lepomis macrochirus*	LC_{50}	159 mg/L	Vendor SDS

Crustacea

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Salt of N,N-Diethyl-p-Phenyl enediamine (1 - 5%) CAS#: -	48 Hours	*Daphina magna*	EC_{50}	10.8 mg/L	Internal Data

Algae

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	72 Hours	None reported	EC_{50}	300 mg/L	ECHA

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Mixture
No data available.

Bioaccumulation
Material does not bioaccumulate
Mixture
No data available.

Partition coefficient log K_{ow} ~ 0

Mobility

Soil Organic Carbon-Water Partition Coefficient log K_{oc} ~ 0

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

US EPA Waste Number Not applicable

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

Note: No special precautions necessary.

Additional information

15. REGULATORY INFORMATION

National Inventories

For Inventory status, "complies" means, listed on the inventory, exempted or otherwise complies.

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECI	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Phosphoric acid, disodium salt 7558-79-4	5000 lb	-	-	X

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Phosphoric acid, disodium salt 7558-79-4	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

IMERC: Not applicable

New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

U.S. State Right-to-Know Regulations

This product may contain substances regulated by state right-to-know regulations.

Chemical name	New Jersey	Massachusetts	Pennsylvania
Phosphoric acid, disodium salt 7558-79-4	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Phosphoric acid, disodium salt	180.0910	21 CFR 182.1778,21 CFR 182.6290,21 CFR 182.6778,21 CFR 182.8778
Disodium EDTA	180.0940	-

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)
Not applicable
NFPA and HMIS Classifications

NFPA	Health hazards - 2	Flammability - 0	Instability - 0	Physical and chemical properties -
HMIS	Health hazards - 2 - *	Flammability - 0	Physical hazards - 0	Personal protection - X - I

Key or legend to abbreviations and acronyms used in the safety data sheet

ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
ATSDR	ATSDR (Agency for Toxic Substances and Disease Registry)
CCRIS	CCRIS (Chemical Carcinogenesis Research Information System)
CDC	CDC (Center for Disease Control)
CEPA	CEPA (Canadian Environmental Protection Agency)
CICAD	CICAD (Concise International Chemical Assessment Documents)
ECHA	ECHA (The European Chemicals Agency)
EEA	EEA (European Environment Agency)
EPA	Environmental Protection Agency
ERMA	ERMA (New Zealands Environmental Risk Management Authority)
ECOSARS	Estimation through ECOSARS v1.11 part of the Estimation Programs Interface (EPI) Suite™
FDA	FDA (Food & Drug Administration)
GESTIS	GESTIS (Information System on Hazardous Substances of the German Social Accident Insurance)
HSDB	HSDB (Hazardous Substances Data Bank)
INERIS	INERIS (The National Industrial Environment and Risks Institute)
IPCS INCHEM	IPCS INCHEM (International Programme on Chemical Safety)
IUCLID	IUCLID (The International Uniform Chemical Information Database)
NITE	Japan National Institute of Technology and Evaluation (NITE)
NIH	NIH (National Institutes of Health)
NIOSH	NIOSH (National Institute for Occupational Safety and Health)
LOLI	LOLI (List of Lists - An International Chemical Regulatory Database)
NDF	no data
NICNAS	Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH IDLH	Immediately Dangerous to Life or Health
OSHA	Occupational Safety and Health Administration of the US Department of Labor
PEEN	PEEN (Pan European Ecological Network)
RTECS	RTECS (Registry of Toxic Effects of Chemical Substances)
SIDS	SIDS (Screening Information Dataset) for High Volume Chemicals
SYKE	The Finnish Environment Institute (SYKE)
USDA	USDA (United States Department of Agriculture)
USDC	USDC (United States Department of Commerce)
WHO	WHO (World Health Organization)

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By Hach Product Compliance Department

Issue Date 28-May-2021

Revision Date 10-Feb-2025

Revision Note None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY ©2025

End of Safety Data Sheet

SAFETY DATA SHEET

acc. To OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulation

Revision Date: 13-June-2019
Reviewed Date: 05-March-2024 Revision 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name	pH 4.01 Buffer, Red
Product Number(s)	00654-00, 05942-21, 05942-10, 05942-22, 05942-24, 05942-25, 05942-15, 00653-08, 00653-14, 00651-06, 00651-36, 00651-76, 98767-77, 98767-80 This SDS applies to pH 4.01 buffers with Lot # starting with CC.
Pure Substance/mixture	Mixture

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Use as laboratory reagent
Uses advised against	No information available

Manufacture/Supplier Cole-Parmer™
North America
625 East Bunker Court
Vernon Hills, IL
60061 USA
Tel: 1-800-323-4340

E-mail address info@coleparmer.com
Made In USA
Emergency Telephone 888-358-4717

2. HAZARDS IDENTIFICATION

Classification

Classification - Mixture
Classification according to Regulation (EC) No. 1272/2008 [CLP]
This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS]
Classification according to EU Directives 67/548/EEC or 1999/45/EC
For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16.

Symbol(s)
Not dangerous goods.

Label Elements

Emergency Overview

The product contains no substances which at their given concentration, are considered hazardous to health.

Appearance Light Red **Physical State** Liquid **Odor** None

EUH210 - Safety data sheet available upon request.

Precautionary Statements

P202 - Do not handle until all safety information has been read and understood.

Hazards not otherwise classified (HNOC)

No information available

Other Information

No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Chemical Formula	EC-No.	CAS-No	Weight %	Trade Secret
Water	-	-	7732-18-5	90-100 %	*
Potassium Acid Phthalate	-	212-889-4	877-24-7	0-10 %	*
Cetylpyridinium Chloride	C21 H38 NCl	204-593-9	123-03-5	0-10 %	*
Methyl Red Solution 0.1%	-	-	845-10-3	0-10 %	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First Aid Measures

General Advice — Use first aid treatment according to the nature of the injury. For further assistance, contact your local Poison Control Center. Show this safety data sheet to the doctor in attendance.

Eye Contact — In case of eye contact, remove contact lens and rinse thoroughly with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact — Wash off immediately with soap and plenty of water while removing all contaminated clothing and shoes. If skin reactions occur, contact a physician.

Inhalation — Move to fresh air. If breathing is difficult, give oxygen. If symptoms persist, obtain medical attention.

Ingestion — Clean mouth with water and drink afterwards plenty of water. Do not include vomiting. Call a physician or Poison Control Center immediately.

Production of First-Aiders — Use personal protective equipment. See Section 8 for more detail. Do not use mouth to mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical devices.

Most important symptoms and effects, both acute and delayed

Most important symptoms/effects — No information available

Indication of any immediate medical attention and special treatment needed

Notes to Physician — Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media

No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions — Use personal protective equipment. Refer to Section 8. Evacuate personnel to safe areas.

Environmental Precautions — Beware of vapors accumulating to form explosives concentrations. Vapors can accumulate in low areas.

Method and Material for Containment and Cleaning Up

Methods for Containment — Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling To avoid risks to human health and the environment, comply with the instructions for use. Wear personal protective equipment. Avoid breathing dust/fume/gas/mist/vapors/spray Ensure adequate ventilation, especially in confined areas.

Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

Conditions for Safe Storage, Including any Incompatibilities

Storage Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Keep away from direct sunlight.

Incompatible Products No information available.

Specific end use(s)

Specific use Laboratory reagent

Risk Management Methods (RMM) The information required is contained in this Safety Data Sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region-specific regulatory bodies.

Appropriate Engineering Controls

Engineering Measures Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face Protection Wear chemical splash goggles. If splashes are likely to occur, wear: Face-shield.

Skin and Body Protection Wear protection gloves/clothing

Respiratory Protection None required under normal usage. In case of inadequate ventilation wear respiratory protection.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties.

Physical State	Liquid
Appearance	Light red
Odor	None
Odor Threshold	No information available
pH Range	3.51-5.51

Property	**Values**	**Remarks * Method**
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	No information available	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	

Specific Gravity	No information available
Water Solubility	soluble
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition Temperature	
Decomposition Temperature	No information available
Kinematic Viscosity	No information available
Dynamic Viscosity	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk Density	No information available

10. STABILITY AND REACTIVITY

Reactivity

No information available

Chemical Stability

Stable under normal conditions

Possibility of Hazardous Reactions

None under normal processing

Conditions to Avoid

Extremes of temperature and direct sunlight

Incompatible Materials

No information available

Hazardous Decomposition Products

Thermal decomposition can lead to release of irritating gases and vapors.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	No information available
Eye Contact	No information available
Skin Contact	No information available
Ingestion	No information available

Component		LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	7732-18-5	>90 mL/kg (Rat)	-	-
Cetylpyridinium Chloride	123-03-5	LD50 200mg/kg (rat)	-	LC50/4 H 0.05 mg/L (ATE)

Information on Toxicological Effects

Symptoms No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization	No information available
Mutagenic Effects	No information available
Carcinogenicity	No information available
Reproductive Effects	No information available
STOT – single exposure	No information available
STOT – repeated exposure	No information available
Aspiration hazard	No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity
This material is not expected to be harmful to aquatic life.

Persistence and Degradability
No information available

Bioaccumulation/Accumulation
No information available

Mobility
No information available

Results of PBT and vPvB assessment
No information available

Other adverse effects
No information available

Endocrine Disruptor Information
No information available

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods

Waste Disposal Methods	Disposal should be in accordance with applicable regional, national and local laws and regulations. Do not discharge to sewer.
Contaminated Packaging	Improper disposal or reuse of this container may be dangerous and illegal.

14. TRANSPORT INFORMATION

DOT	Not regulated
TDG	Not regulated
MEX	Not regulated
ICAO	Not regulated
IATA	Not regulated
IMDG/IMO	Not regulated
RID	Not regulated
ADR	Not regulated
ADN	Not regulated

15. REGULATORY INFORMATION

European Union
Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

International Inventories

USINV	Component listed
CANINV	Component listed
EINECS/ELINCS	Component listed
IECSC	Component listed
AICS	Component listed

USINV/TSCA – United States Toxic Substances Control Act Section 8(b) Inventory
CANINV/DSL/NDSL – Canadian Domestic Substances List/Non-Domestic Substance List
EINECS/ELINCS – European Inventory of Existing Commercial Chemical Substance / EU List of Notified Chemical Substances

IECSC – Chinese Inventory of Existing Chemical Substances
AICS – Australian Inventory of Chemical Substances

U.S. Federal Regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazardous Communication Standard, 29 CFR 1910.1200.

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40n of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Not applicable

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

State Right-to-Know

Massachusetts Right-to-Know Act – Substance List	Not regulated	
New Jersey Worker and Community Right-to-Know Act	Potassium hydrogen phthalate	CAS 877-24-7
Pennsylvania Right-to-Know Act – Hazardous Substance	Potassium hydrogen phthalate	CAS 877-24-7
Rhode Island Right-to-Know Act	Not regulated	

U.S. EPA Label Information

No information available

16. OTHER INFORMATION

Revision Date:	13-June-2019
Reviewed Date:	05-March-2024

Disclaimer:

IMPORTANT: The information contained in this SDS is correct to the best of our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties of any kind as to the accuracy or completeness of the information contained herein or the merchantability or fitness of the product or this information for a particular purpose. It is the responsibility of each individual buyer/user to determine the suitability of this information and the product for its intended purposes. Product sales are subject to Cole Parmer standard terms and conditions of sale. This information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions, or is altered in any way. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable government requirements. Since conditions of use of the product are not under direct control of Cole Parmer, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Cole Parmer will not be liable for any injuries or damages resulting from handling, use, misuse or contact with the product.

SAFETY DATA SHEET

Revision Date: 15-May-2026 Revision 3

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name: Conductivity / TSD Standard Solutions
23 µS/cm Conductivity Solution
84 µS/cm Conductivity Solution
447 µS/cm Conductivity Solution
1413 µS/cm Conductivity Solution
1,500 µS/cm Conductivity Solution
2,070 µS/cm Conductivity Solution
2,764 µS/cm Conductivity Solution
8,974 µS/cm Conductivity Solution
12,880 µS/cm Conductivity Solution
15,000 µS/cm Conductivity Solution
80,000 µS/cm Conductivity Solution
111,900 µS/cm Conductivity Solution

Product Number(s): 00606-10, 00653-15, 00653-16, 00653-23, 00653-18, 00653-20, 00653-27, 00653-47, 00653-89, 00653-50, 00653-32, 00653-35, 00653-36, 00653-37, 00653-38, 35653-08, 35653-09, 35653-10, 35653-11, 35653-13, 35653-14

Pure Substance/mixture: Mixture

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use: Use as laboratory reagent
Uses advised against: No information available

Manufacture/Supplier

Cole-Parmer™
North America
625 East Bunker Court
Vernon Hills, IL
60061 USA
Tel: 1-800-323-4340

E-mail address: info@coleparmer.com

Made In: USA

Product Information

888-358-4717
8:00 am – 6:00 pm CST

2. HAZARDS IDENTIFICATION

Classification

Classification – Mixture

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Classification according to Regulation (EC) No. 1272/2008 [CLP]
This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS]

Symbol(s)

Not dangerous goods.

Label Elements

Emergency Overview

The product contains no substances which at their given concentration, are considered hazardous to health.

Appearance Clear **Physical State** Liquid **Odor** None

EUH210 - Safety data sheet available upon request.

Precautionary Statements

P202 - Do not handle until all safety information has been read and understood.

Hazards not otherwise classified (HNOC)

No information available

Other Information

No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous ingredients

Component	Chemical Formula	EC-No.	CAS-No	Classification according Regulation (EC) No. 1272 [CLP]	Weight %	Trade Secret
Water	-	-	7732-18-5	-	>92 %	*
Potassium chloride	KCL	231-211-8	7447-40-7	-	0-6 %	*
N-Proponal	-	-	71-23-8	-	1-2 %	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First Aid Measures

General Advice — Use first aid treatment according to the nature of the injury. For further assistance, contact your local Poison Control Center. Show this safety data sheet to the doctor in attendance.

Eye Contact — In case of eye contact, remove contact lens and rinse thoroughly with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact — Wash off immediately with soap and plenty of water while removing all contaminated clothing and shoes. If skin reactions occur, contact a physician.

Inhalation — Move to fresh air. If breathing is difficult, give oxygen. If symptoms persist, obtain medical attention.

Ingestion — Clean mouth with water and drink afterwards plenty of water. Do not include vomiting. Call a physician or Poison Control Center immediately.

Production of First-Aiders — Use personal protective equipment. See Section 8 for more detail. Do not use mouth to mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical devices.

Most important symptoms and effects, both acute and delayed

Most important symptoms/effects No information available

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions	Use personal protective equipment. Refer to Section 8. Evacuate personnel to safe areas.
Environmental Precautions	Avoid discharge into drains, water courses or onto the ground.

Method and Material for Containment and Cleaning Up

Methods for Containment	Prevent further leakage or spillage if safe to do so.
Methods for Cleaning Up	Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling	To avoid risks to human health and the environment, comply with the instructions for use. Wear personal protective equipment. Avoid breathing dust/fume/gas/mist/vapors/spray Ensure adequate ventilation, especially in confined areas.
Hygiene Considerations	Handle in accordance with good industrial hygiene and safety practice.

Conditions for Safe Storage, Including any Incompatibilities

Storage	Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Keep away from direct sunlight.
Incompatible Products	No information available.

Specific end use(s)

Specific use	Calibration and storage of pH meters/probes.

Risk Management Methods (RMM) The information required is contained in this Safety Data Sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Appropriate Engineering Controls

Engineering Measures	Showers Eyewash stations Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face Protection	Wear chemical splash goggles. If splashes are likely to occur, wear: Face-shield.
Skin and Body Protection	Wear protection gloves/clothing
Respiratory Protection	None required under normal usage. In case of inadequate ventilation wear respiratory protection.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties.

Physical State	Liquid
Appearance	Clear
Odor	None
Odor Threshold	No information available
pH Range	4.7 – 7.8

Property	Values	Remarks * Method
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	No information available	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	
Specific Gravity	No information available	
Water Solubility	soluble	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition Temperature		
Decomposition Temperature	No information available	
Kinematic Viscosity	No information available	
Dynamic Viscosity	No information available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk Density	No information available

10. STABILITY AND REACTIVITY

Reactivity

No information available

Chemical Stability

Stable under normal conditions

Possibility of Hazardous Reactions

None under normal processing

Conditions to Avoid

Extremes of temperature and direct sunlight

Incompatible Materials
No information available

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	No information available
Eye Contact	No information available
Skin Contact	No information available
Ingestion	No information available

Information on Toxicological Effects

Symptoms	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization	No information available
Mutagenic Effects	No information available
Carcinogenicity	No information available
Reproductive Effects	No information available
STOT – single exposure	No information available
STOT – repeated exposure	No information available
Aspiration hazard	No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity
This material is not expected to be harmful to aquatic life.

Persistence and Degradability
No information available

Bioaccumulation/Accumulation
No information available

Mobility
No information available

Results of PBT and vPvB assessment
No information available

Other adverse effects
No information available

Endocrine Disruptor Information
No information available

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods

Waste Disposal Methods	Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated Packaging	Improper disposal or reuse of this container may be dangerous and illegal.

14. TRANSPORT INFORMATION

DOT	Not regulated
TDG	Not regulated
MEX	Not regulated
ICAO	Not regulated
IATA	Not regulated
IMDG/IMO	Not regulated
RID	Not regulated
ADR	Not regulated
ADN	Not regulated

15. REGULATORY INFORMATION

European Union Regulations

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

International Inventories

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

USINV/ TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
CANINV/ DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

U.S. Federal Regulations

This product is not known to be a “Hazardous Chemical” as defined by the OSHA Hazardous Communication Standard, 29 CFR 1910.1200.

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40n of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Not applicable

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and

Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

State Right-to-Know

Massachusetts Right-to-Know Act – Substance List	Not regulated
New Jersey Worker and Community Right-to-Know Act	Not regulated
Pennsylvania Right-to-Know Act – Hazardous Substance	Not regulated
Rhode Island Right-to-Know Act	Not regulated

U.S. EPA Label Information

No information available

16. OTHER INFORMATION

Revision Date: 15-May-2026

Disclaimer:

IMPORTANT: The information contained in this SDS is correct to the best of our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties of any kind as to the accuracy or completeness of the information contained herein or the merchantability or fitness of the product or this information for a particular purpose. It is the responsibility of each individual buyer/user to determine the suitability of this information and the product for its intended purposes. This information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions, or is altered in any way. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable government requirements. Since conditions of use of the product are not under direct control of Traceable Products, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Traceable Products will not be liable for any injuries or damages resulting from handling, use, misuse or contact with the product.