

Town of Hull, MA
Stormwater Management Program (SWMP):
Volume 2
NPDES Phase II Small MS4 General Permit
September 2019

ILLICIT DISCHARGE DETECTION &
ELIMINATION (IDDE) PLAN



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Town of Hull, MA
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ILLICIT DISCHARGE DETECTION & ELIMINATION (IDDE) PLAN

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1.0 INTRODUCTION

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Hull (the Town) to address the IDDE program requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereinafter referred to as the "MS4 Permit". The MS4 Permit requires a Stormwater Management Program (SWMP), which is comprised of four parts. This IDDE Plan is Volume 2 of 4.

- SWMP Volume 1 – Stormwater Management Plan
- SWMP Volume 2 – Illicit Discharge Detection and Elimination (IDDE) Plan
- SWMP Volume 3 – Good Housekeeping and Pollution Prevention (O&M) Plan
- SWMP Volume 4 – Annual Reports

2.0 OBJECTIVE

The objective of this IDDE program is to systematically find and eliminate sources of non-stormwater discharges to the municipal separate storm sewer system and implement procedures to prevent such discharges. The required timeline for implementing the IDDE program per the MS4 Permit is shown in Table 2-1.

Table 2-1 IDDE Program Implementation Timeline

IDDE Program Requirements	Completion Date from Effective Date of MS4 permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	→					
SSO Inventory	→					
Written Catchment Investigation Procedure	→	→				
Phase I Mapping	→	→	→			
Phase II Mapping	→	→	→	→	→	→
Dry Weather Outfall Screening and Sampling	→	→	→	→		
Follow-up Ranking of Outfalls and Interconnections	→	→	→	→		
Catchment Investigations – Problem Outfalls	→	→	→	→	→	
Catchment Investigations – all Problem, High and Low Priority Outfalls	→	→	→	→	→	→
Training for All IDDE Staff	Annually					

3.0 LEGAL AUTHORITY AND STATEMENT OF RESPONSIBILITIES

The Town of Hull is in the process of drafting and adopting a Bylaw which will provide legal authority to: prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system; and implement appropriate enforcement procedures and actions.

The Department of Public Works is the lead municipal department responsible for implementing the IDDE program. They have primary responsibility for mapping, screening and sampling, catchment investigations, illicit discharge removal, training and annual reporting components of the program in addition to overall implementation and coordination. There are other departments that assist in operating, managing and inspecting the sanitary sewer and storm drain and/or review plans for proposed construction and inspecting new construction that connect to these systems. These departments have key roles in implementing the IDDE program effectively. They are listed below with roles and responsibilities identified that support planning and administrative efforts of the IDDE program:

- Building Department/Inspector – Construction Site SW Control, Inspections, IDDE
- Conservation Commission - Stormwater Bylaw/Regulations, Post Construction SWM, Plan Review, Inspection
- Sewer Department – Good housekeeping, SWPPP, O&M of facilities, IDDE

The Department of Public Works will conduct meetings involving persons with key roles from the departments listed above to review the responsibilities and coordinate IDDE efforts between the departments. The meetings will educate the different departments about IDDE and the roles of each in identifying and resolving illicit discharges.

4.0 DEFINITIONS

The following definitions are provided for terms used in this IDDE Plan.

A catchment is the area that drains to an individual outfall or interconnection.

A sanitary sewer overflow (SSO) is a discharge of untreated sanitary wastewater from a municipal sanitary sewer.

An illicit discharge is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from firefighting activities.

An interconnection is 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.

Key junction is a manhole or structure that can represent one or more junction manholes without compromising adequate implementation of the IDDE program. Adequate implementation of the IDDE program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the ability to determine possible presence of an upstream illicit discharge.

The MATRIX is the Outfall/Interconnection Data and Priority Ranking Matrix, located in Appendix B.

MS4 is a municipal separate storm sewer system

An outfall is 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. (40 CFR § 122.26(b)(9)).

5.0 PROHIBITIONS AND REQUIRED ACTIONS

Illicit discharges to the MS4 are prohibited.

Upon detection of an illicit discharge or SSO, the Town will commence action to locate, identify and eliminate the illicit discharge as expeditiously as possible. Upon identification of the illicit source the Town will notify all parties responsible for any such discharge and require immediate cessation of improper disposal practices in accordance with its legal authorities. Where elimination of an illicit discharge within 60 days of its identification as an illicit discharge is not possible, an expeditious schedule will be established for its elimination and the dates of identification and schedules for removal will be included in annual reports. In the interim, the Town will take all reasonable and prudent measures to minimize the discharge of pollutants to and from its MS4.

6.0 NON-STORMWATER DISCHARGES

The following categories of non-stormwater discharges are allowed under the MS4 Permit unless the Town, EPA, or the MassDEP identifies any category or individual discharge of non-stormwater discharge listed below as a significant contributor of pollutants to the MS4, in which case that category or individual discharge is not allowed, and is to be deemed an “illicit discharge” and treated as part of the IDDE Program.

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
- Uncontaminated pumped ground water
- Discharge from potable water sources
- 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
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

Discharges or flows from firefighting activities are allowed under the MS4 Permit and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

7.0 SANITARY SEWER OVERFLOWS

The Town has identified all known locations where SSOs have discharged to the MS4 within the previous five (5) years. This is detailed in a table in Appendix H and includes SSOs resulting, during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for communication of flow between the systems. The Town will continue to monitor and identify SSOs. The inventory of all future identified SSOs will include the following information, if available:

- Location (approximate street crossing/address and receiving water, if any);
- A statement of whether the discharge entered a surface water directly or entered the MS4;
- Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge);
- Estimated volume(s) of the occurrence;
- Description of the occurrence indicating known or suspected cause(s);
- Mitigation and corrective measures completed with dates implemented; and
- Mitigation and corrective measures planned with implementation schedules.

See Appendix H for the SSO inventory.

In accordance with Paragraph B.12 of Appendix B of the Permit, upon becoming aware of an SSO to the MS4, the Town will provide oral notice to EPA within 24 hours. Additionally, written notice will be provided to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence and will include the information in the updated inventory. The notice will contain all of the information listed in part 2.3.4.4.b. Where common notification requirements for SSOs are included in multiple NPDES permits issued to a Town, a single notification may be made to EPA as directed in the Town's wastewater or combined sewer overflow (CSO) NPDES permit and constitutes compliance with this part.

An updated SSO inventory will be included in annual reporting, including the status of mitigation and corrective measures implemented to address each SSO identified pursuant to this part.

It is understood that the period between detection and elimination of a discharge from the SSO to the MS4 is not a grace period. Discharges from an MS4 that are mixed with an SSO are not authorized by the Permit and remain unlawful until eliminated.

8.0 SYSTEM MAPPING

Mapping of the Town's separate storm sewer system is required to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit sanitary sewer discharges. The following information, outlined by phase, is required as described in the MS4 Permit:

Phase I: System mapping required within two (2) years of the permit effective date (by June 2020):

- Outfalls and receiving waters (required by MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally-owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of waters report pursuant to Clean Water Act section 303(d) and 305(b)
- Initial catchment delineations developed from available system data and topographic information.

Phase II: Information that must be included in the map for all outfalls with ten (10) years of the permit effective date, and updated as information becomes available during implementation of catchment investigations:

- Outfall spatial location (latitude and longitude with a minimum accuracy of ± 30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations based on new information collected during catchment investigations
- Municipal sanitary sewer system

The following information is to be included in the system map as information becomes available:

- Storm sewer material, size (pipe diameter) and age
- Sanitary sewer system material, size (pipe diameter) and age
- Privately-owned stormwater treatment structures
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high-density urban areas
- Area where the Town of Hull's MS4 has received or could receive flow from septic system discharges (e.g., areas with poor soils, or high ground water elevations unsuitable for conventional subsurface disposal systems)

- Seasonal high water table elevations impacting sanitary alignments
- Topography
- Orthophotography
- Alignments, dates and representation of work completed (with legend) of past illicit discharge investigations (e.g., flow isolation, dye testing, CCTV)
- Locations of suspected, confirmed and corrected illicit discharges (with dates and flow estimates).

The existing system map can be found in Appendix A. The Town will update the mapping as necessary to reflect newly discovered information and required corrections or modifications and will report on the progress towards the completion of the system map in each annual report.

9.0 OUTFALL AND INTERCONNECTION INVENTORY

The outfall and interconnection inventory identifies each outfall and interconnection discharging from the MS4, including its location and condition based on existing information. The inventory is recorded in the MATRIX, which provides documentation for tracking data, inspections, screenings and other IDDE program activities.

The MATRIX will be updated annually to include data collected in connection with the dry weather screening and other relevant inspections conducted as part of the IDDE program. See Appendix B for the MATRIX.

10.0 INITIAL RANKING OF OUTFALLS AND INTERCONNECTIONS

The Town investigated, and recorded in the MATRIX, the catchment area characteristics of each outfall and interconnection where information is available including the following:

- Past discharge complaints and reports
- 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.
- 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.
- Age of development and infrastructure – Industrial areas greater 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.
- 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.
- 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.
- Culverted streams – any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.
- Water quality limited waterbodies that receive a discharge from the MS4 or waters with approved total maximum daily loads (TMDLs) applicable to Hull, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

Based on the information above, the outfalls were classified into one of the following categories and recorded in the MATRIX:

Problem outfalls: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information will be designated as Problem outfalls. This will include any outfalls/interconnections where previous screening indicates likely sewer input. According to the MS4 Permit, 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

Problem outfalls need not be screened pursuant to part 2.3.4.7.b of the Permit.

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;

- determined by the permittee as high priority based on the characteristics listed above or other available information;
- discharging to any waterbody impaired for bacteria or pathogens.

Low Priority outfalls: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

Excluded outfalls: Outfalls/interconnections that have no potential for illicit discharges. 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 Outfall Ranking Map, located in Appendix C, shows the locations of Problem, High Priority, and Low Priority outfalls. All of the Hull outfalls fell into the “High Priority” category due to the proximity to the beaches. Therefore, in order to have a more meaningful ranking system displayed on the map, the red, yellow, and green categories correspond to the “Priority Ranking” corresponds to additional criteria, such as bacteria in the water and drainage from high density generating sites. The “Priority Ranking” is further broken down in Appendix B of the IDDE Program.

11.0 DRY WEATHER OUTFALL & INTERCONNECT SCREENING & SAMPLING

All outfalls/interconnections (excluding Problem and Excluded outfalls) will be inspected for the presence of dry weather flow and sampled as required within three (3) years of the permit effective date. The Town will screen all High and Low Priority outfalls in accordance with their initial ranking developed as part of the outfall/interconnection inventory and initial ranking in Appendix B.

Dry weather screening and sampling will proceed only when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. The following information is to be recorded and included in the summary report for outfall screening:

- unique identifier
- receiving water
- date of most recent inspection
- dimensions
- shape
- material (concrete, PVC)
- spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- physical condition
- indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatables, or oil sheen)

If an outfall/interconnection is inaccessible or submerged, proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results.

If no flow is observed, but evidence of illicit flow exists, the outfall will be revisited during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow.

Where dry weather flow is found at an outfall/interconnection, at least one (1) sample will be collected, and analyzed at a minimum for:

- ammonia
- chlorine
- conductivity
- salinity
- E. coli (freshwater receiving water) or enterococcus (saline or brackish receiving water)
- surfactants (such as MBAS)
- temperature
- pollutants of concern.

When the discharge is directly into a water quality limited water, or a water subject to an approved TMDL as indicated in Appendix F of the MS4 Permit, the sample will be analyzed for the pollutant(s) of concern identified as the cause of the impairment as specified in Appendix G of the MS4 Permit. The receiving waters and pollutants of concern for sampling are identified in Table 11-1 and on the map in

Appendix C. The estimated number of outfalls directly discharging to these receiving waters are identified in the NOI and their locations are identified on the map in Appendix C.

All analyses 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 requirements. Sampling for bacteria and pollutants of concern will be conducted using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. Sampling for ammonia and surfactants must use sufficiently sensitive methods to detect those parameters at or below the threshold indicator concentrations of 0.5 mg/L for ammonia and 0.25 mg/L for surfactants. Sampling for residual chlorine must use a method with a detection limit of 0.02 mg/L or 20 ug/L. Detailed dry weather screening and sampling procedures, methods and forms can be found in Appendix D.

All screening and sampling data collected in compliance with this part will be submitted in the Annual Report.

The MATRIX will be updated annually to reprioritize outfalls and interconnections based on information gathered during dry weather screening and sampling. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or where sampling results indicate sewer input will be considered highly likely to contain illicit discharges from sanitary sources, and ranking of such outfalls/interconnections will be updated to the top of the High Priority outfalls category for investigation.

Table 11-1 MS4 Area Receiving Waters and Pollutants of Concern for Sampling

NAME	CATEGORY	SEGMENT ID	WATERSHED	IMPAIRMENT CAUSE (EPA TMDL NO.)	MONITORING PARAMETERS FOR ANALYSIS (NMR = No Monitoring Requirement)
Boston Harbor	5	MA70-01	Boston Harbor (Proper)	Fecal Coliform	Fecal Coliform
				Other (Contaminants in Fish and Shellfish)	NMR
				PCB in Fish Tissue	NMR
Hull Bay	5	MA70-09	Boston Harbor (Proper)	Fecal Coliform	Fecal Coliform
				Other (Contaminants in Fish and Shellfish)	NMR
				PCB in Fish Tissue	NMR
Weir River	5	MA74-11	Boston Harbor: Weymouth & Weir	Fecal Coliform	Fecal Coliform
				Other (Contaminants in Fish and Shellfish)	NMR
				PCB in Fish Tissue	NMR
Hingham Bay	5	MA70-07	Boston Harbor (Proper)	Fecal Coliform	Fecal Coliform
				Other (Contaminants in Fish and Shellfish)	NMR
				PCB in Fish Tissue	NMR
*Massachusetts Bay	-	-	-	-	-

Source: Massachusetts Year 2016 Integrated List of Waters
(<http://www.mass.gov/eea/docs/dep/water/resources/07v5/16ilwplst.pdf>)

* Massachusetts Bay is not included in the MA listing of Integrated Waters and therefore no impairments are identified to be addressed under the Permit. This does not, however, indicate that none exist.

NOTE: Table Based on the proposed Massachusetts Year 2016 Integrated List of Waters with exceptions/clarifications where 2014 Integrated List of Waters (ILW) are more stringent as noted below. Certain Pollutants (in BOLD) result in Total Maximum Daily Load (TMDL) or Water Quality Limited Water Bodies (WQLW) requirements defined in Appendix H & F of the Permit.

- 1) 2016 Integrated List of Waters clarifies "Other" impairments to mean "Contaminants in Fish and Shellfish" in all waters listed above

12.0 CATCHMENT INVESTIGATIONS

The Permit requires that each catchment associated with an outfall or interconnection of the Town's MS4 be investigated for potential illicit discharges. This section outlines a systematic procedure to prioritize and conduct outfall catchment investigations and to trace the source of potential illicit discharges. The procedures include the following steps as outlined in the Permit and described in this section:

1. Identify maps, historic plans and records, and other sources of data: to be used in identifying system vulnerability factors within each catchment.
2. Manhole inspection methodology: methodology for performing storm drain network investigation by systematically and progressively observing, sampling, and evaluating all key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs, even where no evidence of an illicit discharge is observed at the outfall. Methodology includes procedures for dry and wet weather investigations
3. Procedures that will isolate and confirm sources of illicit discharge: to be applied where investigations or physical evidence or screening has identified that the MS4 is influenced by illicit discharges or SSOs and the location of potential contaminate sources needs to be refined. Implementation of more detailed investigations and inspection of manholes for source isolation and confirmation procedures will be followed as described in Section 14.

All data collected as part of the catchment investigation will be recorded using the catchment investigation summary report form in Appendix E and reported in each annual report and used to update the system mapping and MATRIX.

12.1 System Vulnerability Factors (SVFs)

Begin by identifying maps, historic plans, and records and other sources of data including (but not limited to) plans related to construction of the storm drain and of sanitary sewers, prior work performed on the storm drains and sanitary sewers, board of health or other municipal data on septic system failures or required upgrades, and compliant records related to SSOs, sanitary sewer surcharges, and septic system breakouts. Continue by reviewing relevant mapping and system vulnerability factors previously identified for the catchment. Look for any new information that may be available including Board of Health records on plans related to recent construction of storm and sanitary sewer infrastructure, and complaint records related to SSOs. Use this information to identify areas within the catchment with higher potential for illicit connections. The presence of any of the following specific System Vulnerability Factors (SVFs) is to be recorded in the MATRIX:

- 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 Evaluation Surveys, or other infrastructure investigations.

If available, the following information may also be included in the evaluation of SVFs:

- 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 greater than 40 years old;
- 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 than poor owner maintenance);
- 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 than poor owner maintenance);

Catchments with a minimum of one (1) System Vulnerability Factor are subject to wet weather sampling requirements described in Section 12.3.

12.2 Dry Weather Key Junction Manhole Inspections

Field crews are to systematically inspect key junction manholes and gather catchment information of the location of MS4 pipes, manholes and the extent of the contributing catchment. Begin at the first key junction upgradient of the outlet/interconnection or previously investigated key junction and work progressively upstream inspecting and sampling at manholes in the storm drain network to isolate the illicit discharge source as follows:

- During dry weather, key junction manholes will be opened and inspected systematically for visual and olfactory evidence of illicit connections (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present).
- If flow is observed, the Town will sample the flow at a minimum for ammonia, chlorine and surfactants using field kits for these analyses.
- Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream investigation.

Key junction and subsequent manhole investigations will proceed, repeating the inspection and sampling of upstream key junction manholes until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes. Source isolation and confirmation procedures will then be followed as described in Section 14. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

Where catchments do not contain junction manholes, the dry weather screening and sampling will be considered as meeting the manhole inspection requirement and source isolation and confirmation procedures will be followed as described in Section 14.

For most catchments, manhole inspections will proceed from the outfall moving up into the system as described. However, depending on the nature of the drainage system, it may be more efficient to move from upstream down, particularly if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. In either case, once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

12.3 Wet Weather Investigation

After meeting the requirements for dry weather investigation, catchments with a minimum of one (1) System Vulnerability Factor will also be inspected and sampled under wet weather conditions to the extent necessary to determine whether wet-weather induced high flows in the sanitary sewers or high groundwater in areas of septic systems result in discharge of sanitary flow to the MS4. Wet weather outfall sampling will be conducted as follows:

- At least one wet weather screening and sampling will be conducted at the outfall with the same parameters required during dry weather screening.
- Wet weather sampling and screening will proceed during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. Every effort should be made to sample during the spring (March through June) when groundwater levels are relatively high.
- The MS4 permit does not require a minimum rainfall event prior to wet weather screening; however, the rainfall event must result in enough depth or intensity to produce a stormwater discharge at the outfall. Sampling should be avoided during the initial period of discharge ("first flush").

If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in Section 14. If wet weather outfall sampling does not identify evidence of illicit discharges, then the wet weather investigation is complete.

12.4 Marking the Catchment Investigation Complete

If all key junction manholes have been inspected (or, if no key junction manholes are present, junction manholes, or, if no junction manholes are present, the outfall) and found to be free of dry weather flow or illicit discharge indicators, and any required wet weather outfall screening and catchment investigation has been completed, the investigation of that catchment is marked complete.

If sources of illicit discharge or SSO are found in a catchment, the investigation may be marked complete once the sources of the discharge have been isolated and confirmed as described above. In such cases the catchment may be marked “inspection complete, awaiting repair.” Once repairs are finished, further catchment investigation will be scheduled to confirm that all sources of discharge have been eliminated.

If all required manhole inspections are clean but the outfall inspection still shows evidence of illicit discharge, the catchment may be marked “inspection complete, results inconclusive” and the Town will schedule further catchment investigation and/or outfall screening until such time as the source of illicit discharge has been identified, or the catchment has been confirmed to be free of illicit discharges.

12.5 Timeline

Investigations of catchments associated with Problem outfalls, and where any information gathered on the outfall/interconnection identifies sewer input, will begin by the end of Year 2 (June 30, 2020) and will be completed by the end of Year 7 (June 30, 2025). Investigations of catchments associated with High and Low Priority outfalls will follow the ranking of outfalls and will be completed by Year 10 (June 30, 2028). In general, catchment investigations will be performed in the order that the team leader believes is likely to lead to the most rapid identification and elimination of problem discharges to the MS4 and/or local waterways, and the team leader retains the discretion to adjust the prioritization as needed to accomplish that goal.

13.0 CITIZEN CALL IN REPORTS

The Town of Hull will provide opportunity to report suspected illicit discharges through their stormwater website, email, phone and by office visit. When a report is received about a suspected illicit discharge, an Illicit Discharge Incident Tracking Form as found in Appendix G shall be used to document appropriate information.

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.

14.0 IDENTIFICATION/CONFIRMATION OF ILLICIT SOURCE

Where the source of an illicit discharge has been reported and/or delimited between two manholes, more detailed investigation techniques will be used to isolate and confirm the source. Based on the site conditions, one or more of the following techniques may be used:

SANDBAGGING is a technique that can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

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 can be used to locate 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) 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.

15.0 ILLICIT DISCHARGE REMOVAL

When the specific source of an illicit discharge is identified, the Town will exercise its authority as necessary to require its removal pursuant to part 2.3.4.2 or 2.3.4.3 of the MS4 Permit.

For each confirmed source, annual reporting will include the following information:

- 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; and
- estimate of the volume of flow removed.

Within one 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 System Vulnerability Factors 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.

16.0 INDICATORS OF IDDE PROGRAM PROGRESS

The Town of Hull will define or describe indicators for tracking program success and evaluate and report on the overall effectiveness of the IDDE program in each annual report. At a minimum the Town will document in each annual report:

- The MATRIX, updated annually with data collected as part of catchment investigations
- All dry and wet weather screening and sampling results
- Reports on actions taken, SSOs and illicit connection identified and removed, and the estimated volume of sewage removed
- The number and percent of total Town-owned MS4 catchment areas evaluated using the IDDE program procedures
- Training records for frequency and type of employee training

17.0 ONGOING SCREENING

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be reprioritized and scheduled for ongoing screening once every five years. Ongoing screening will consist of dry weather screening and sampling consistent with Section 11 of this report; wet weather screening and sampling will also be required at outfalls where wet weather screening was required due to SVFs as outlined in Section 12.3 of this report.

18.0 TRAINING

The Town will, at a minimum, annually provide training to employees involved in the IDDE program about the program, including how to recognize and report illicit discharges and SSOs. See Appendix F for the IDDE Employee Training Record

19.0 RECORDS AND REPORTING

The progress and effectiveness of the IDDE program will be evaluated and reported on in each annual report. Indicators and documentation for tracking the program success are identified in Section 16. The success of the IDDE program will be measured by the IDDE activities completed within the required MS4 permit timelines.

APPENDIX A

- **Storm Sewer System Map**

Town of Hull, Massachusetts

Storm Sewer System Map

MA70-01
Boston Harbor (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA70-09
Hull Bay (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA70-06
Hingham Bay (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA70-07
Hingham Bay (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA74-11
Weir River (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

Map Legend

MS4 Outfall designation

Outfall to Waterbody within MS4 Area

Outfall to Upland Area (>100' from wetland, >200' from waterbody)

Stormwater Structures

Manhole (386)

Catch Basin (1490)

Subbasins

Boston Harbor

Hingham Bay

Hull Bay

Massachusetts Bay

Weir River

Hydrography

Hydrologic Connection

Open Water

Wetland

Major Watershed Boundary

*MassDEP 2016 Integrated List of Waters

Rivers: Category 4A

Lakes, Estuaries: Category 4A

Rivers: Category 4C

Lakes, Estuaries: Category 4C

Rivers: Category 5

Lakes, Estuaries: Category 5

Roadway Owner

State

Town

Category 1: Attaining all designated uses.

Category 2: Attaining some of the designated uses and insufficient or no data and information is available to determine if the remaining uses are attained.

Category 3: Insufficient or no data and information to determine if any designated uses are attained.

Category 4A: Impaired for one or more designated uses but does not require the development of a TMDL.

Category 4B: Impaired for one or more designated uses but does not require the development of a TMDL.

Category 4C: Impaired for one or more designated uses but does not require the development of a TMDL.

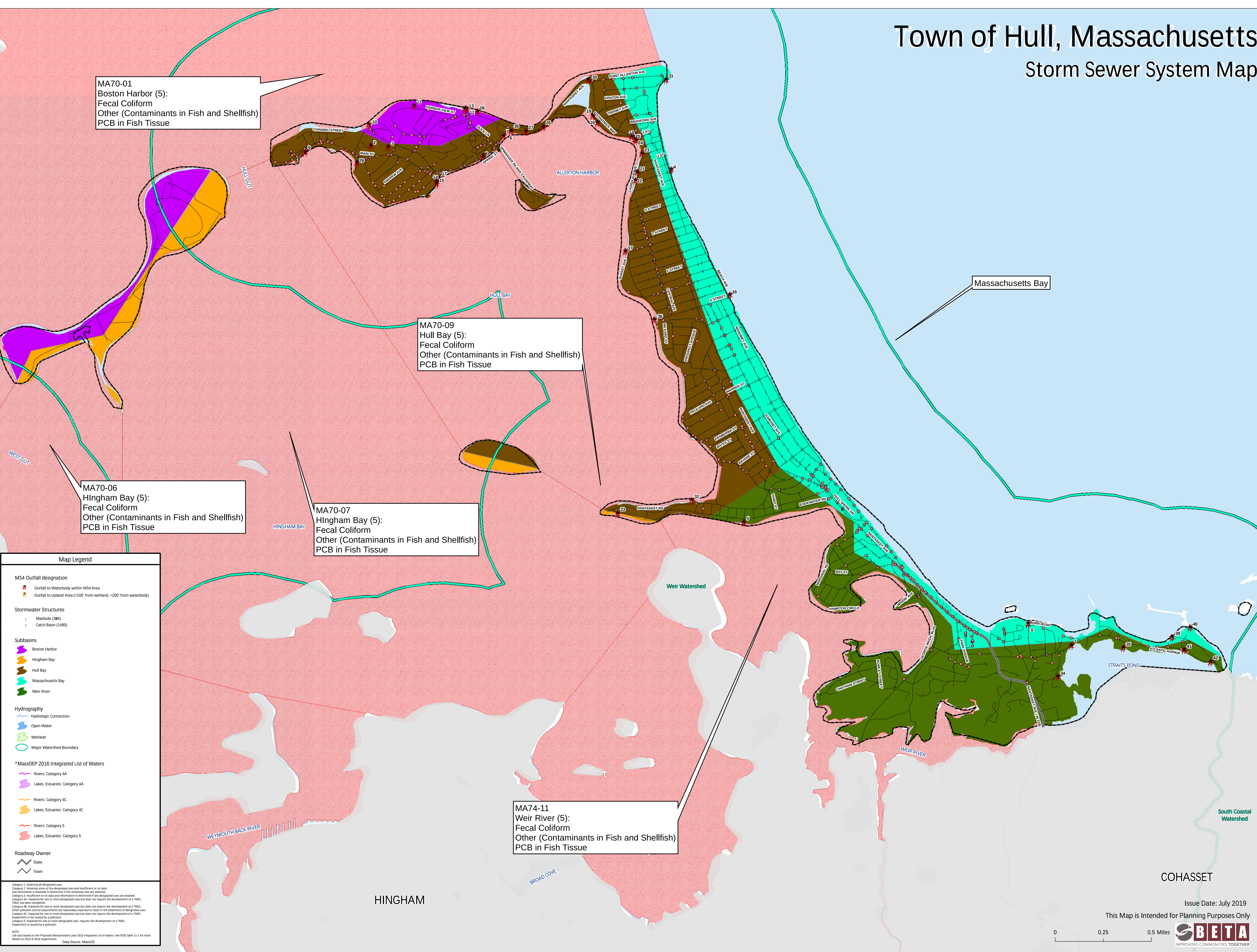
Category 5: Impaired for one or more designated uses, requires the development of a TMDL.

Impairment is caused by a pollutant.

NOTE:

Call outs based on the Proposed Massachusetts year 2016 Integrated List of Waters. See KDE table 11-1 for more details on 2014 & 2016 impairments.

Data Source: MassGIS



APPENDIX B

- **MS4 Outfall and Interconnection Inventory and Priority Ranking Matrix**

		Outfall Info						Priority Ranking Criteria (Yes=1, No=0)							
Outfall ID	Town Descriptor	Stream Segment	Waterbody Name	Category (Problem, High, Low, Excluded)	Known or suspected illicit discharge	Discharging to an area of concern to public health concern ¹	Priority ranking (based on criteria)	Past discharge complaint? (No Data Available)	Poor receiving water quality (TMDL for bact/ecoli)?	High density of generating sites? ²	Infrastructure over 40 yrs old? (No Data Available)	Sewer conversion (No Data Available)	Historic Combined Sewer Systems (No Data Available)	Culverted streams? (No Data Available)	Dry Weather Flow Present? (No Data Available)
9	high school op14	MA70-09	Hull Bay	High	No	Yes	2		1	1					
18	fitz OP 21	MA70-09	Hull Bay	High	No	Yes	2		1	1					
23	v st OP 25	MA70-09	Hull Bay	High	No	Yes	2		1	1					
24	y st OP 36	MA70-09	Hull Bay	High	No	Yes	2		1	1					
25	x st OP 37	MA70-09	Hull Bay	High	No	Yes	2		1	1					
34	richards road OP 46	MA74-11	Weir River	High	No	Yes	2		1	1					
36	op18-0008	MA70-09	Hull Bay	High	No	Yes	2		1	1					
0	op48-0005	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
1	op510004	MA70-09	Hull Bay	High	No	Yes	1		1	0					
2	-	MA70-09	Hull Bay	High	No	Yes	1		1	0					
3	-	MA70-09	Hull Bay	High	No	Yes	1		1	0					
5	op30-0007	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
6	op07-0012	MA70-09	Hull Bay	High	No	Yes	1		1	0					
7	op07-0013	MA70-09	Hull Bay	High	No	Yes	1		1	0					
8	op07-0014	MA70-09	Hull Bay	High	No	Yes	1		1	0					
10	ocean ave OP15	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
11	jacobs OP 15	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
12	duck lane OP 16	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
13	museum OP 17	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
14	james ave OP 18	MA70-09	Hull Bay	High	No	Yes	1		1	0					
15	james ave OP 19	MA70-09	Hull Bay	High	No	Yes	1		1	0					
17	james ave OP 20	MA70-09	Hull Bay	High	No	Yes	1		1	0					
19	fitz OP 21	MA70-09	Hull Bay	High	No	Yes	1		1	0					
20	fitz OP 22	MA70-09	Hull Bay	High	No	Yes	1		1	0					
21	r st OP 22	MA70-09	Hull Bay	High	No	Yes	1		1	0					
22	q st OP 23	MA70-09	Hull Bay	High	No	Yes	1		1	0					
26	spring st OP 38	MA70-09	Hull Bay	High	No	Yes	1		1	0					
27	spring st OP 39	MA70-09	Hull Bay	High	No	Yes	1		1	0					
28	hlm OP 40	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
29	coast guard OP 41	MA70-09	Hull Bay	High	No	Yes	1		1	0					
30	allerton OP 42	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
32	nan road OP 44	MA70-09	Hull Bay	High	No	Yes	1		1	0					
33	edgewater OP 45	MA70-07	Hingham Bay	High	No	Yes	1		1	0					
35	straits OP 47	MA74-11	Weir River	High	No	Yes	1		1	0					

¹ Outfall discharging to MassGIS Shellfishing Suitability Areas or potential recreational beach or water supply area

² Outfall located in commercial or industrial zone or in vicinity of landfill

* Massachusetts Bay not designated/categorized by the Integrated Waters List

		Outfall Info						Priority Ranking Criteria (Yes=1, No=0)							
Outfall ID	Town Descriptor	Stream Segment	Waterbody Name	Category (Problem, High, Low, Excluded)	Known or suspected illicit discharge	Discharging to an area of concern to public health concern ¹	Priority ranking (based on criteria)	Past discharge complaint? (No Data Available)	Poor receiving water quality (TMDL for bact/ecoli)?	High density of generating sites? ²	Infrastructure over 40 yrs old? (No Data Available)	Sewer conversion (No Data Available)	Historic Combined Sewer Systems (No Data Available)	Culverted streams? (No Data Available)	Dry Weather Flow Present? (No Data Available)
37	op14-0009	MA70-09	Hull Bay	High	No	Yes	1		1	0					
38	op08-0012	MA70-01	Boston Harbor	High	No	Yes	1		1	0					
41	op54-0003	MA74-11	Weir River	High	No	Yes	1		1	0					
42	op55-0004	MA74-11	Weir River	High	No	Yes	1		1	0					
4	op11-3n	*	Massachusetts Bay	High	No	Yes	0		0	0					
16	a st oceanside OP 20	*	Massachusetts Bay	High	No	Yes	0		0	0					
31	allerton OP 43	*	Massachusetts Bay	High	No	Yes	0		0	0					
39	op55-0001	*	Massachusetts Bay	High	No	Yes	0		0	0					
40	op55-0002	*	Massachusetts Bay	High	No	Yes	0		0	0					
¹ Outfall discharging to MassGIS Shellfishing Suitability Areas or potential recreational beach or water supply area															
² Outfall located in commercial or industrial zone or in vicinity of landfill															
* Massachusetts Bay not designated/categorized by the Integrated Waters List															

APPENDIX C

- **Outfall Ranking Map**

Town of Hull, Massachusetts

Outfall Ranking Map

MA70-01
Boston Harbor (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA70-09
Hull Bay (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA70-06
Hingham Bay (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA70-07
Hingham Bay (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

MA74-11
Weir River (5):
Fecal Coliform
Other (Contaminants in Fish and Shellfish)
PCB in Fish Tissue

Map Legend

Outfall Ranking Category

- High - 2
- High - 1
- High - 0

Stormwater Structures

- Manhole (360)
- Catch Basin (1490)

Subbasins

- Boston Harbor
- Hingham Bay
- Hull Bay
- Massachusetts Bay
- Weir River

Hydrography

- Hydrologic Connection
- Open Water
- Wetland
- Major Watershed Boundary

***MassDEP 2016 Integrated List of Waters**

- Rivers: Category 4A
- Lakes, Estuaries: Category 4A
- Rivers: Category 4C
- Lakes, Estuaries: Category 4C
- Rivers: Category 5
- Lakes, Estuaries: Category 5

Roadway Owner

- State
- Town

Category 1: Attaining all designated uses.
Category 2: Attaining some of the designated uses and insufficient or no data and information is available to determine if the remaining uses are attained.
Category 3: Insufficient or no data and information to determine if any designated uses are attained.
Category 4A: Insufficient for one or more designated uses but does not require the development of a TMDL.
Category 4B: Insufficient for one or more designated uses but does not require the development of a TMDL.
Category 4C: Insufficient for one or more designated uses but does not require the development of a TMDL.
Category 5: Insufficient for one or more designated uses but does not require the development of a TMDL.
Implementation is required by a pollutant.

NOTE:
Call outs based on the Proposed Massachusetts year 2016 Integrated List of Waters. See KDE table 11-1 for more details on 2014 & 2016 impairments.
Data Source: MassGIS

APPENDIX D

- **Screening/Sampling Standard Operating Procedures and Forms**

SAMPLING SPECIFICATIONS STANDARD OPERATING PROCEDURES AND FORMS

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) was prepared for the collection of stormwater sampling as required by the Massachusetts MS4 General Permit. The SOP outlines procedures to:

- Collect field water quality measurements
- Screen for the presence of ammonia, surfactants and residual chlorine using field test kits; and
- Collect samples for laboratory analysis for e.coli or enterococcus along with identified pollutants of concern for that catchment. Per the MS4 permit, the pollutant of concern is identified as the compound causing the impairment and shall be sampled for the requirements outlined in Appendix G of the permit.

2.0 OUTFALL SAMPLING REQUIREMENTS

Dry weather flow shall be sampled for the parameters summarized in **Table 1** along with pollutant of concern.

3.0 EQUIPMENT INSPECTION, MAINTENANCE, AND CALIBRATION

- The field test kit reagents have expiration dates (the surfactant test kit has the shortest expiration date (5 months)). One month prior to initiating a sampling program check all expiration dates and order as needed. Dispose of expired test kits per manufacturer instruction.
- Prior to each sampling event, each of the test kits will be inspected to ensure the availability of testing materials (Hach strips, reagents, etc.).
- Instructions for each test kit is attached. A laminated version of the test kit instructions has been made and should be used in the field.
- Calibration of the YSI 556 Multiparameter System unit (YSI) is completed by the rental company (US Environmental). Calibration checks on the YSI meters and colorimeter will be performed by the Field Team prior to each sampling event with the equipment being re-adjusted as needed in accordance to manufacturer's instructions.

4.0 MSDS SHEETS AND WASTE MANAGEMENT

A material safety data sheet (MSDS) for each of the field test kits is attached. Active ingredients for each field test kit is listed below, however, the MSDS should be reviewed for hazards, proper personal protective equipment (PPE) and waste management as part of the training to use these test kits.

Chemetrics K-9400 Surfactant Screening kit: Reagents include chloroform, sodium phosphate, sulfuric acid and methylene blue

Hach NI-SA ammonia test kit: Reagents contain 3-7% sodium hydroxide

Hach CN-80 total and residual chlorine test kit: Reagents include sodium phosphate, potassium iodide, DPD salt, glycine and disodium EDTA.

During field testing, reagent waste will be placed in a 1-liter amber jar labeled "Waste" and brought back to the office for disposal.

Table 1: Monitoring and Sampling Parameters and Methods

Analysis	Monitoring Parameter	EPA or approved Method No.	Field Test Kit	Field Instr.	Lab	Req'd MDL	Field Instrument	Range	Laboratory Glassware	Preservation	Holding Time
Ammonia (un-ionized)	Ammonia - Nitrogen	350.1	X			0.5 mg/L	Hach NI-SA (fresh or saltwater) or Hach test strips (freshwater only)	0-2.5 mg/L	125-250 mL plastic	Ice	Instant
Chlorine	-	-	X			0.02 mg/L	Hach CN 80	0-10 mg/L	125-250 mL plastic	Ice	Instant
Conductivity	-	-		X		0.2 mS/cm	YSI 556		500 mL plastic	Ice	Instant
Salinity	Specific Conductance	120.1		X		-	YSI 556		500 mL plastic	Ice	Instant
Escherichia coli	E. coli (fresh water)	1103.1; 1603; Colilert® 12 16, Colilert-18® 12 15 16; mColiBlue-24®17			X	4 cfu or mpn	-		125-250 mL sterile plastic	Ice	6 hours to Lab
Enterococcus	Enterococcus (Marine water)	1106.1; 1600; Enterolert® 12 22			X	4 cfu or mpn	-		125-250 mL sterile plastic	Ice	6 hours to Lab
Surfactant-MBAS	MBAS		X			0.25 mg/L	Chemetrics K*9400	0-3 mg/L	125-250 mL plastic	Ice	Instant
pH	pH	150.2		X		-	YSI 556		-	-	Instant
Temp, water	NMR	-		X		0-40 C	YSI 556	-	-	-	Instant
*Fecal Coliform	Fecal Coliform	1680; 1681			X	1 cfu	-	-	4oz sterile cup	Ice	8 hours to Lab
*Phosphorus	Phosphorus, Total	365.1; 365.2; 365.3; SM 4500-P-E			X	10 ug/L	-	-	125-250 mL plastic	H2SO4 (pH <2) + Ice	28 Days
*Nitrogen	Nitrogen, Total	351.1/351.2 + 353.2			X	0.2 mg/L	-	0.05-2.0 mg	16oz plastic	Ice	48 hours
*DO	Dissolved Oxygen	365.1; 365.2; 365.3		X			YSI 556		-	-	Instant
*BOD	BOD ₅	360.1; 360.2			X		-	-	1 liter plastic	<6°C/Ice	48 hours
*TSS	Total Suspended Solids	160.2, 180.1			X		-	-		Ice	

Sampling requirements in accordance with §2.3.4.7.b.iii.4 of Massachusetts MS4 Permit

MDL = minimum detection limit

NMR = no monitoring required

5.0 FIELD MEASUREMENT PROCEDURE

- Whenever possible, the field measurements will be taken at the center of the discharge flow, at half of the depth and upstream of the sample collector. For the YSI meter, care will be taken not to allow the probe to contact any accumulated sediment.
- The sample collection point, collection conditions, and accessibility will be noted on the field data sheet.
- Equipment will be cleaned following each sampling location.

6.0 SAMPLE COLLECTION PROCEDURES

Procedures for collecting a grab sample are summarized below:

- Do not eat or drink during sample collection and processing.
- Do not collect or process samples near a running vehicle.
- Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
- Depending on the analysis, preservatives (e.g. sulfuric acid, hydrochloric acid) are added to some sample containers by the lab. Never touch the inside surface of a sample container or lid, even with gloved hands. Do not dump out the preservative or overfill the sample containers.
- Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
- Label the sample with the time and sample ID.

7.0 ANALYTICAL METHODS AND HOLDING TIMES

Check holding times for the requested analytical. Note that the lab needs sufficient time to extract and process the sample. Due to short holding time the lab needs any samples that are to be analyzed for e.coli, fecal coliform, or enterococcus within 6 hours of collection. Record the time that the bacteria samples were collected. A summary of the laboratory holding times is provided in **Table 1**.

8.0 DATA EVALUATION

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.

As described in the EPA New England Bacterial Source Tracking Protocol:

- “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.
- 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).
- 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.”

The following table was obtained from the EPA IDDE Guidance Manual, 2004.

Table 2: Parameter specifications

Parameter	Discharge Types It Can Detect				Laboratory/Analytical Challenges
	Sewage	Wash water	Tap Water	Industrial or Commercial Liquid Wastes	
Ammonia	•	•	○	•	Can change into other nitrogen forms as the flow travels to the
Boron	•	•	○	N/A	
Chlorine	○	○	○	○	High chlorine demand in natural waters limits utility to flows with very high chlorine concentrations
Color	•	•	○	•	
Conductivity	•	•	○	•	Ineffective in saline waters
Detergents Surfactants	•	•	○	•	Reagent is a hazardous waste
<i>E. coli</i> Enterococci Total Coliform	•	○	○	○	24-hour wait for results Need to modify standard monitoring protocols to measure high bacteria concentrations
Fluoride*	○	○	•	○	Reagent is a hazardous waste Exception for communities that do not fluoridate their tap water
Hardness	•	•	•	•	
pH	○	•	○	•	
Potassium	•	○	○	•	May need to use two separate analytical techniques, depending on the concentration
Turbidity	•	•	○	•	
● = Can almost always (>80% of samples) distinguish this discharge from clean flow types (e.g., tap water or natural water). Fortap water, can distinguish from natural water. • = Can sometimes (>50% of samples) distinguish this discharge from clean flow types depending on regional characteristics, or can be helpful in combination with another parameter ○ = Poor indicator. Cannot reliably detect illicit discharges, or cannot detect tap water N/A = Data are not available to assess the utility of this parameter for this purpose. Data sources: Pitt (this study) *Fluoride is a poor indicator when used as a single parameter, but when combined with additional parameters (such as					

9.0 STORMWATER MONITORING FIELD EQUIPMENT LIST

Field Equipment

- | | |
|--|--|
| ☐ Log book | ☐ Waders/Boots |
| ☐ COC forms | ☐ Telescopic pole and dipper cups |
| ☐ Laminated field test kit Instructions | ☐ YSI multi parameter Meter |
| ☐ Sample Bottles- See sampling chart | ☐ Turbidimeter (If required per App G) |
| ☐ Coolers with Ice | ☐ Hach Ammonia test kit (NI-SA) (salt or freshwater) |
| ☐ Sharpies | ☐ Hach Ammonia Test strips (freshwater only) |
| ☐ Pens | ☐ Chemetrics K-9400 Surfactant test kit |
| ☐ Paper towels | ☐ Hach CN80 residual chlorine test kit |
| ☐ Wet Wipes | ☐ Waste Container for field test kits (1 amber liter clearly labeled waste) |
| ☐ Sampling plan | |
| ☐ Nitrile Gloves | |
| ☐ Squirt bottle of DI Water | |

10.0 REFERENCES

YSI Pro 30 Users Manual (2011) <https://www.ysi.com/File%20Library/Documents/I1>

[Pro30-Manual-English.pdf](#)

Chemetrics Instructions [http://www.chemetrics.com/Detergents+\(anionic+surfactants, 9400/R-9400](http://www.chemetrics.com/Detergents+(anionic+surfactants, 9400/R-9400)

Hach test strips <http://www.hach.com/teststrips>

Town of Hull

SCREENING AND SAMPLING FORM

Type:	☐ Outfall ☐ Interconnection ☐ Key Junction	☐ Pipe ☐ DMH ☐ CB ☐ Other	ID:	
Location:		Material:		Size:
Inspector:		Date:		Time:
Weather:	☐ Sunny ☐ Cloudy ☐ Rain ☐ Snow	Recent Rainfall:		

ENVIRONMENTAL INSPECTION

Area:	☐ Residential ☐ Commercial ☐ Industrial ☐ Municipal ☐ Open Space ☐ Unknown				
Flowing To:	☐ Upland ☐ Wetland/Marsh ☐ Stream/River ☐ Lake/Pond ☐ Open Space ☐ Other MS4 ☐ Outfall				
Submerged:	☐ Yes ☐ No	Accessible:	☐ Yes... ☐ No	Other Info:	

FLOW

Amount:	☐ None ☐ Drip ☐ Trickle ☐ Moderate ☐ Substantial	Clarity:	☐ None ☐ Clear ☐ Cloudy ☐ Opaque
Color:		Other Info:	

INDICATORS OF POTENTIAL ISSUES – FURTHER INVESTIGATION RECOMMENDED

Sediment:	☐ Yes ☐ No	Scouring:	☐ Yes ☐ No	Staining	☐ Yes ☐ No
Algae Growth:	☐ Yes ☐ No	Stressed Vegetation	☐ Yes ☐ No	Floatables	☐ Yes ☐ No
Oil Sheen:	☐ Yes ☐ No	Turbidity:	☐ Yes ☐ No	Floatables	☐ Yes ☐ No
Odor:	☐ None ☐ Sewer ☐ Eggs ☐ Fuel ☐ Laundry ☐ Unknown			Other:	

SAMPLING

Sampling Required:	☐ Yes ☐ No	Sampling Performed:	☐ Yes ☐ No	Struct. ID	
Algae Growth:	☐ Yes ☐ No	Stressed Vegetation	☐ Yes ☐ No	Floatables	☐ Yes ☐ No
Oil Sheen:	☐ Yes ☐ No	Turbidity:	☐ Yes ☐ No	Floatables	☐ Yes ☐ No
Odor:	☐ None ☐ Sewer ☐ Eggs ☐ Fuel ☐ Laundry ☐ Unknown			Other:	

RECORDED DATA

Ammonia:		Salinity:		Temp:		pH:	
Chlorine:		Conductivity:		Surfactant:	☐ Yes ☐ No		

LAB SAMPLES TAKEN

☐ E. coli		☐ Phosphorus		☐ Nitrogen		☐ DO	
☐ Enterococcus		☐ Fecal Coliform		☐ Metals		☐ TSS	
Sent To			Date:		Date Received:		



Be Right™

SAFETY DATA SHEET

Issue Date 27-Nov-2017

Revision Date 27-Nov-2017

Version 3

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1. IDENTIFICATION

Product identifier

Product Name Ammonia Nitrogen 1 Reagent

Other means of identification

Product Code(s) 1455523

Safety data sheet number M00944

Recommended use of the chemical and restrictions on use

Recommended Use Determination of ammonium nitrogen.

Uses advised against No information available.

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 Sub-category A
Serious eye damage/eye irritation	Category 1
Respiratory sensitization	
Skin sensitization	
Mutagenicity	
Carcinogenicity	
Reproductive toxicity	
Specific target organ toxicity (single exposure)	
Specific target organ toxicity (repeated exposure)	

Hazards not otherwise classified (HNOC)

Not applicable

Label elements

Signal word - Danger

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Hazard statements

H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage

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
P363 - Wash contaminated clothing before reuse
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P405 - Store locked up
P501 - Dispose of contents/ container to an approved waste disposal plant
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
P234 - Keep only in original container
P390 - Absorb spillage to prevent material damage

Other Information

Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Not applicable

Mixture

Chemical Family Mixture.
Chemical nature aqueous solution.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Sodium hydroxide	1310-73-2	3 - 7%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice	See section 8 for PPE that may be required during handling. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). If no local exhaust use approved fume hood and/or respirator. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. Remove from exposure, lie down. Immediate medical attention is required. IF IN EYES: Flush eyes for at least 15 minutes. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
Skin contact	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.
Inhalation	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a physician immediately.
Ingestion	IF SWALLOWED: Rinse Mouth. Do NOT induce vomiting. Call a physician immediately.
Self-protection of the first aider	First aider: Pay attention to self-protection!. Use personal protective equipment as required. 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. 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.

Most important symptoms and effects, both acute and delayed

Symptoms See Section 11: TOXICOLOGICAL INFORMATION.

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.

Flammable properties

Substance does not burn.

Specific hazards arising from the chemical

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating and toxic gases and vapors. In the event of fire and/or explosion do not breathe fumes.

Hazardous combustion products This material will not burn.

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

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

Evacuate personnel to safe areas. Remove all sources of ignition. Do not touch or walk through spilled material. Ventilate affected area. Use personal protective equipment as required.

For emergency responders

Use personal protection recommended in Section 8.

Environmental precautions

Environmental precautions

Do not allow into any sewer, on the ground or into any body of water. Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. 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. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up

Take necessary precautions in observance of pertinent physical hazards. Neutralize spill if necessary. Soak up with inert absorbent material. Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly. Dispose of in accordance with local, state and federal regulations or laws.

Emergency Response Guide Number

Not applicable

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling

Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Do not breathe dust/fume/gas/mist/vapors/spray.

Conditions for safe storage, including any incompatibilities

Storage Conditions

Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labeled containers.

Flammability class

Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	TWA: 2 mg/m ³ (vacated) Ceiling: 2 mg/m ³	IDLH: 10 mg/m ³ Ceiling: 2 mg/m ³

Chemical name	Alberta OEL	British Columbia	Manitoba OEL	New Brunswick	Newfoundland &
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		OEL		OEL	Labrador OEL
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³

Chemical name	Northwest Territories OEL	Nova Scotia OEL	Nunavut OEL	Ontario TWA	Prince Edward Island OEL
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³

Chemical name	Quebec OEL	Saskatchewan OEL	Yukon OEL
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³

Other Information Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Legend See section 16 for terms and abbreviations

Appropriate engineering controls

Engineering Controls If no local exhaust use approved fume hood or self-contained breathing apparatus
If no local exhaust use approved fume hood and/or respirator
Showers
Eyewash stations

Individual protection measures, such as personal protective equipment

Eye/face protection Wear tight sealing safety goggles and/or face protection shield. Avoid contact with eyes.

Skin and body protection Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection Do not breathe gas/fumes/vapor/spray. If no local exhaust use approved fume hood and/or respirator. In case of inadequate ventilation wear respiratory protection.

General Hygiene Considerations Avoid breathing (dust, vapor, mist, gas). Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wear suitable gloves and eye/face protection. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Keep away from food, drink and animal feeding stuffs. Regular cleaning of equipment, work area and clothing is recommended. Handle in accordance with good industrial hygiene and safety practice. Avoid prolonged or repeated contact with skin. Take off all contaminated clothing and wash it before reuse.

Environmental exposure controls

Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Liquid

Gas Under Pressure Not classified according to GHS criteria

Appearance aqueous solution

Color Colorless to light yellow

Odor None

Odor threshold Not applicable

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<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Molecular weight	Not applicable	
pH	10.0	
Melting point/freezing point	No data available	
Boiling point / boiling range	~ 100 °C / 212 °F	Estimation based on theoretical calculation
Evaporation rate	0.46 (water = 1)	
Vapor pressure	No data available	
Vapor density (air = 1)	No data available	
Specific gravity (water = 1 / air = 1)	1.163	
Partition Coefficient (n-octanol/water)	No information available	
Soil Organic Carbon-Water Partition Coefficient	No data available	
Autoignition temperature	No data available	
Decomposition temperature	No information available	
Dynamic viscosity	No data available	
Kinematic viscosity	No information available	

Solubility(ies)

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other Information

Metal Corrosivity	Not classified as corrosive to metal according to GHS criteria
GHS Metal Corrosivity Classification	Category 1, H290
Steel Corrosion Rate	No data available /
Aluminum Corrosion Rate	No data available /
Bulk density	Not applicable
Explosive properties	Not classified according to GHS criteria.
Explosion data	No data available
Upper explosion limit	No information available

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Lower explosion limit

No information available

Flammable properties

Not classified as flammable according to GHS criteria.

Flammability Limit in Air

Upper flammability limit:

No data available

Lower flammability limit:

No data available

Flash point

No data available

Method

No information available

Oxidizing properties

Not classified according to GHS criteria.

Reactivity properties

Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.

10. STABILITY AND REACTIVITY

Reactivity properties

Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria

Chemical stability

Stable under recommended storage conditions.

Special dangers of the product

None reported

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Extremes of temperature and direct sunlight. Incompatible materials.

Incompatible materials

Strong oxidizing agents. Strong acids. Strong bases.

Hazardous Decomposition Products

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Explosive properties

Not classified according to GHS criteria.

Upper explosion limit

No information available

Lower explosion limit

No information available

Autoignition temperature

No data available

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Sensitivity to Static Discharge

None reported

Sensitivity to Mechanical Impact

None reported

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Product Information	Corrosive to skin. Corrosive to eyes.
Inhalation	Causes burns. Corrosive by inhalation.
Eye contact	Corrosive to the eyes and may cause severe damage including blindness. Causes burns.
Skin contact	Cause severe skin burns and eye damage.
Ingestion	Ingestion causes burns of the upper digestive and respiratory tracts.
Aggravated Medical Conditions	Eye disorders. Skin disorders. Respiratory disorders.
Toxicologically synergistic products	None known.
Toxicokinetics, metabolism and distribution	No information available.

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)	33,798.00 mg/kg
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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 hydroxide (3 - 7%) CAS#: 1310-73-2	Rabbit LD ₅₀	500 mg/kg	None reported	None reported	No information available

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
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	Rabbit LD ₅₀	1350 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)

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

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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

No information available

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 hydroxide (3 - 7%) CAS#: 1310-73-2	Patch test	Human	20 mg	24 hours	Corrosive to skin	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 hydroxide (3 - 7%) CAS#: 1310-73-2	Standard Draize Test	Rabbit	0.05 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.

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

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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 hydroxide	1310-73-2	-	-	-	-

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

No data available

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
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

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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 hydroxide (3 - 7%) CAS#: 1310-73-2	96 hours	<i>Oncorhynchus mykiss</i>	LC ₅₀	45.4 mg/L	IUCLID (The International Uniform Chemical Information Database)

Crustacea

If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	48 Hours	<i>Daphnia sp.</i>	EC ₅₀	40.4 mg/L	IUCLID (The International Uniform Chemical Information Database)

Algae

If available, see ingredient data below

Other Information

Persistence and degradability

Product Biodegradability Data

If available, see ingredient data below.

Ingredient Biodegradability Data

Test data reported below

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
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	None reported	None reported	None reported	Readily biodegradable

Bioaccumulation

Product Bioaccumulation Data

No data available.

Partition Coefficient (n-octanol/water)

No information available

Ingredient Bioaccumulation Data

No data available

Chemical name	Partition Coefficient (n-octanol/water)	Method
Sodium hydroxide (3 - 7%)	log K _{ow} ~ 0	No information available

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CAS#: 1310-73-2		
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Mobility

Product Information

Soil Organic Carbon-Water Partition Coefficient No data available

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Ingredient Information

<u>Chemical name</u>	<u>Soil Organic Carbon-Water Partition Coefficient</u>	<u>Method</u>
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	log K _{oc} ~ 0	No information available

<u>Chemical name</u>	<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water solubility temperature °C</u>	<u>Water solubility temperature °F</u>
Sodium hydroxide CAS#: 1310-73-2	Completely soluble	420000 mg/L	0 °C	32 °F

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Contaminated packaging Do not reuse container.

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. Allow cold water to run for 5 minutes to completely flush the system.

14. TRANSPORT INFORMATION

U.S. DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

Additional information

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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)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium hydroxide 1310-73-2	1000 lb	-	-	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

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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)
Sodium hydroxide 1310-73-2	1000 lb	-	RQ 1000 lb final RQ RQ 454 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 hydroxide 1310-73-2	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Sodium hydroxide	180.0910	21 CFR 184.1763

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

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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

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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



Be Right™

SAFETY DATA SHEET

Issue Date 09-Aug-2016

Revision Date 12-Feb-2018

Version 8.200001

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1. IDENTIFICATION

Product identifier

Product Name DPD Free Chlorine Reagent

Other means of identification

Product Code(s) 1407028

Safety data sheet number M00109

HMRIC # HMIRA Registry Number 9935 Filed 2016-04-11

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory Use. Determination of Free 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



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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

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 phosphate dibasic	7558-79-4	30 - 40%	-
DPD Salt	-	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. 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.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.
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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.

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.
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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 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 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.

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Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid	Color	White to light pink
Appearance	powder	Odor threshold	No data available
Odor	Odorless		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Molecular weight	No data available	
pH	6.3	1% Solution
Melting point/freezing point	No data available	
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)	1.76	
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	110 °C / 230 °F	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
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

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Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Sodium phosphate dibasic	7558-79-4	No data available	-
DPD Salt	-	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
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

Carbon dioxide. Carbon monoxide. Phosphorus oxides. Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

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Information on Likely Routes of Exposure

Product Information

Inhalation May cause irritation of respiratory tract.

Eye contact 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 (30 - 40%) CAS#: 7558-79-4	Phosphates are widely utilized by cells for metabolism of proteins, fats and carbohydrates.
Disodium EDTA (1 - 5%) CAS#: 139-33-3	EDTA and related compounds are poorly absorbed by the digestive system.

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)	19,881.00 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
DPD Salt (1 - 5%) CAS#: -	Rat LD ₅₀	695 mg/kg	None reported	None reported	Outside testing
Disodium EDTA (1 - 5%)	Rat LD ₅₀	2000 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical

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CAS#: 139-33-3					Substances)
Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium phosphate dibasic (30 - 40%) CAS#: 7558-79-4	Rat LD ₅₀	17000 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Rabbit LD ₅₀	2300 mg/kg	None reported	None reported	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 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
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 (30 - 40%) CAS#: 7558-79-4	Standard Draize Test	Rabbit	500 mg	24 hours	Skin irritant	RTECS (Registry of Toxic Effects of Chemical Substances)
Disodium EDTA (1 - 5%) CAS#: 139-33-3	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 (30 - 40%)	Standard Draize Test	Rabbit	500 mg	24 hours	Eye irritant	RTECS (Registry of Toxic Effects of Chemical Substances)

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CAS#: 7558-79-4						
Disodium EDTA (1 - 5%) CAS#: 139-33-3	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.

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

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Sodium phosphate dibasic	7558-79-4	-	-	-	-
DPD Salt	-	-	-	-	-
Disodium EDTA	139-33-3	-	-	-	-

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 *in vitro* Data

No data available.

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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
Disodium EDTA (1 - 5%) CAS#: 139-33-3	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 *in vivo* 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 *in vivo* 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

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
Disodium EDTA (1 - 5%) CAS#: 139-33-3	96 hours	<i>Lepomis macrochirus</i>	LC ₅₀	159 mg/L	Vendor SDS

Crustacea

If available, see ingredient data below

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Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
DPD Salt (1 - 5%) CAS#: -	48 Hours	<i>Daphnia magna</i>	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
Disodium EDTA (1 - 5%) CAS#: 139-33-3	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
DPD Salt (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
DPD Salt (1 - 5%) CAS#: -	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

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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

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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 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 phosphate dibasic 7558-79-4	5000 lb	-	-	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)
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
Disodium EDTA	180.0940	-

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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 09-Aug-2016

Revision Date 12-Feb-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.

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HACH COMPANY©2017

End of Safety Data Sheet



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SAFETY DATA SHEET

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1. IDENTIFICATION

Product identifier

Product Name DPD Total Chlorine Reagent

Other means of identification

Product Code(s) 1406499

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



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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

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 phosphate dibasic	7558-79-4	20 - 30%	-
Potassium iodide (KI)	7681-11-0	20 - 30%	-
DPD Salt	-	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.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.
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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.
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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.

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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

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
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

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
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

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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	No data available	-
DPD Salt	-	Not applicable	-
Glycine, N,N-1,2-ethanediybis[N-(carboxymeth yl)-, disodium salt, dihydrate	6381-92-6	Not applicable	-

Explosive properties

Upper explosion limit
Lower explosion limit

No data available
No data available

Flammable properties

Flash point
Method

Not applicable
No information available

Flammability Limit in Air

Upper flammability limit:
Lower flammability limit:

No data available
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.

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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 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

Oral Exposure Route

Test data reported below

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%) CAS#: 7681-11-0	Rat LD ₅₀	2779 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)

DPD Salt (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

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

If available, see data below

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)	Standard Draize	Rabbit	None	None	Skin irritant	No information

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(20 - 30%) CAS#: 7681-11-0	Test		reported	reported		available
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	None reported	Rabbit	None reported	None reported	Eye irritant	HSDB (Hazardous Substances Data Bank)
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 Zealand's 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

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

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Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

If available, see data below
If available, see data below

Product Carcinogenicity Data

Oral Exposure Route
Dermal Exposure Route
Inhalation (Dust/Mist) Exposure Route
Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

No data available
No data available
No data available
No data available
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	-	-	-	-
DPD Salt	-	-	-	-	-
Glycine, N,N-1,2-ethanediylbis[N-(c arboxymethyl)-, 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
Dermal Exposure Route
Inhalation (Dust/Mist) Exposure Route
Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

If available, see data below
If available, see data below
If available, see data below
If available, see data below
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%) CAS#: 7681-11-0	Cytogenetic analysis	Rat ascites tumor	500 mg/kg	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of 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
Dermal Exposure Route
Inhalation (Dust/Mist) Exposure Route
Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

No data available
No data available
No data available
No data available
No data available

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Ingredient Germ Cell Mutagenicity *in vivo* 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
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	96 hours	<i>Oncorhynchus mykiss</i>	LC ₅₀	896 mg/L	PEEN (Pan European Ecological Network)
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-,	96 hours	<i>Lepomis macrochirus</i>	LC ₅₀	159 mg/L	Vendor SDS

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disodium salt, dihydrate (<1%) CAS#: 6381-92-6					
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Crustacea

If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
DPD Salt (1 - 5%) CAS#: -	48 Hours	<i>Daphnia magna</i>	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
DPD Salt (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
DPD Salt (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

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Soil Organic Carbon-Water Partition Coefficient

log K_{oc} ~ 0

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
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

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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 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 phosphate dibasic 7558-79-4	5000 lb	-	-	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)
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.

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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

Product Code(s) 1406499
Issue Date 19-Oct-2016
Version 4.2

Product Name DPD Total Chlorine Reagent
Revision Date 12-Feb-2018
Page 17 / 17

Issue Date 19-Oct-2016

Revision Date 12-Feb-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.

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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.: 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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Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

CHEMetrics, Inc.

Chemwatch: 9-87557

SDS No: R9402

Version No: 3.6

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code:

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
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Label elements

Hazard pictogram(s)	
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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...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

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.
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-66-3	71	<u>chloroform</u>
7732-18-5	26	<u>water</u>
13472-35-0	2	<u>sodium phosphate, monobasic, dihydrate</u>
7664-93-9	1	<u>sulfuric acid</u>
61-73-4	<0.1	<u>methylene blue</u>
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...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

- ▶ 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 conjunctival 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...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

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 acid smoke. carbon dioxide (CO₂) 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 analytical 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.
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Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

	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 range 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. BRETHERRICK 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...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

sodium phosphate, monobasic, dihydrate	Not Available	Not Available
sulfuric acid	15 mg/m ³	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

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...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

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	<table> <tr> <th>TOXICITY</th><th>IRRITATION</th></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>	TOXICITY	IRRITATION														
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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.																

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

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 hemolysis 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 dapson. 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...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

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-oxidation 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 exposure 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. ▶
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SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

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
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Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

	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: CHEMetrics® Ampoules for Filming Amines CHEMetrics® Kit & Refill (R-1001) and for Detergents CHEMetrics® 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:

CHEMetrics 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 CHEMetrics 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).

CHEMetrics®, VACUettes®, Vacu-vials®, and Titrets® are registered trademarks of CHEMetrics Inc.



CHEMetrics Ampoules for Filming Amines CHEMetrics Kit & Refill (R-1001) and for Detergents CHEMetrics Kit & Refill (R-9401)

CHEMetrics, Inc.

Chemwatch: 9-92655

SDS No: R1001

Version No: 2.2

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 03/11/2014

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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	CHEMetrics Ampoules for Filming Amines CHEMetrics Kit & Refill (R-1001) and for Detergents CHEMetrics 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
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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
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Label elements

GHS label elements	
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SIGNAL WORD	DANGER
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Hazard statement(s)

H226	Flammable liquid and vapour
H318	Causes serious eye damage
H336	May cause drowsiness or dizziness

Precautionary statement(s) Prevention

Continued...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

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
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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...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

- ▶ **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 acid 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.

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

	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/m ³ / 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/m ³ / 200 ppm	625 mg/m ³ / 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...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

	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
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CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

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)	<table> <tr> <td>TOXICITY</td><td>IRRITATION</td></tr> </table>	TOXICITY	IRRITATION
TOXICITY	IRRITATION		
CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	<table> <tr> <td>TOXICITY</td><td>IRRITATION</td></tr> </table>	TOXICITY	IRRITATION
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

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

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.
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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

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

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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APPENDIX E

- **Catchment Investigation Summary Report Form**

CATCHMENT INVESTIGATION SUMMARY EXAMPLE REPORTING FORM

Date:			Completed By:														
Catchment (aka Outfall / interconnection) Location Description:				Catchment I.D.													
				Catchment Rank:	☐ Problem ☐ High ☐ Low												
Waterbody Name:				Waterbody MassDEP AU ID:													
Dates of Catchment Investigation:	Date Began: _____ Date Ended: _____	Type of Investigation (Check all that Apply)	☐ Dry Weather ☐ Wet Weather														
Manhole Types Present/Investigated (ck all that apply):	☐ Key Junction ☐ Junction ☐ Outfall Only																
Description of Investigation:	<u>Example text:</u> Medium sized catchment in residential area. No indications of illicit discharge at outfall. Opened and inspected one key junction manhole and two junction manholes. Found indications of elevated surfactants and visual soap in MH 6753, but no ammonia and no visual or olfactory sewage indicators. Performed visual survey of neighborhood upstream and saw wet spot on street, apparent single family car wash. No system vulnerability factors were discovered. Needed corrections to system map were noted and will be sent to GIS Team. Conclusion: no indications of illicit discharge found and catchment marked complete.																
System Vulnerability Factors (SVFs)	(Check any known or discovered. Must wet screen if one or more required SVF) <table border="0"> <tr> <td>☐ History of SSOs</td> <td>☐ Formerly CSO area</td> </tr> <tr> <td>☐ Common or twin-invert manhole</td> <td>☐ Sewer defects or cross connection</td> </tr> <tr> <td>☐ Common trench sewer and drains</td> <td>☐ Pump station, siphon or constriction*</td> </tr> <tr> <td>☐ Crossings of drain and sewer alignments</td> <td>☐ Sewer or drain >40 yr old*</td> </tr> <tr> <td>☐ Known or suspected underdrain</td> <td>☐ Septic failures*</td> </tr> <tr> <td>☐ Inadequate LOS, surcharge, backups, complaints</td> <td>☐ Other (describe)</td> </tr> </table> * Recommended but not required SVF					☐ History of SSOs	☐ Formerly CSO area	☐ Common or twin-invert manhole	☐ Sewer defects or cross connection	☐ Common trench sewer and drains	☐ Pump station, siphon or constriction*	☐ Crossings of drain and sewer alignments	☐ Sewer or drain >40 yr old*	☐ Known or suspected underdrain	☐ Septic failures*	☐ Inadequate LOS, surcharge, backups, complaints	☐ Other (describe)
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Investigation status and next steps (check all that apply):	☐ Non illicit discharge / SSO concerns noted, conduct targeted outreach ☐ SVFs identified, schedule wet weather screening (do not mark complete until wet screen finished) <table border="0"> <tr> <td>☐ Wet weather outfall screening / catchment investigation complete</td> </tr> <tr> <td>☐ Schedule revisit, further investigation, or advanced testing.</td> </tr> </table> ☐ Investigation complete, no problems found. Schedule follow up screening in 5 years ☐ Investigation complete, but inconclusive. ☐ Investigation complete, awaiting repair. Problem isolated. Schedule re-investigation post repair.					☐ Wet weather outfall screening / catchment investigation complete	☐ Schedule revisit, further investigation, or advanced testing.										
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Description of Potential Illicit Discharge:	(Discharge or Indicator type, volume, indications of source, etc. or none)																

CATCHMENT INVESTIGATION SUMMARY REPORTING FORM

Date:		Completed By:	
Catchment (aka Outfall / interconnection) Location Description:		Catchment I.D.	
		Catchment Rank:	☐ Problem ☐ High ☐ Low
Waterbody Name:		Waterbody MassDEP AU ID:	
Dates of Catchment Investigation:	Date Began: _____ Date Ended: _____	Type of Investigation (Check all that Apply)	☐ Dry Weather ☐ Wet Weather
Manhole Types Present/Investigated (ck all that apply):	☐ Key Junction ☐ Junction ☐ Outfall Only		
Description of Investigation:			
System Vulnerability Factors (SVFs)	(Check any known or discovered. Must wet screen if one or more required SVF) ☐ History of SSOs ☐ Common or twin-invert manhole ☐ Common trench sewer and drains ☐ Crossings of drain and sewer alignments ☐ Known or suspected underdrain ☐ Inadequate LOS, surcharge, backups, complaints ☐ Formerly CSO area ☐ Sewer defects or cross connection ☐ Pump station, siphon or constriction* ☐ Sewer or drain >40 yr old* ☐ Septic failures* ☐ Other (describe) * Recommended but not required SVF		
Investigation status and next steps (check all that apply):	☐ Non illicit discharge / SSO concerns noted, conduct targeted outreach ☐ SVFs identified, schedule wet weather screening (do not mark complete until wet screen finished) ☐ Wet weather outfall screening / catchment investigation complete ☐ Schedule revisit, further investigation, or advanced testing. ☐ Investigation complete, no problems found. Schedule follow up screening in 5 years ☐ Investigation complete, but inconclusive. ☐ Investigation complete, awaiting repair. Problem isolated. Schedule re-investigation post repair.		
Description of Potential Illicit Discharge:	(Discharge or Indicator type, volume, indications of source, etc. or none)		

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RESPONSE ACTION(S)

Description of Next Steps			
Next Steps were completed on:	Date: _____	Confirmed By:	
Attach sketch or supporting documentation as needed			
Additional Notes:			

APPENDIX F

- **IDDE Employee Training Record**

EMPLOYEE TRAINING RECORD

Topic: _____ Date: _____ Duration: _____ Sheet ____ of ____.

Name	Title	Signature

APPENDIX G

- **Illicit Discharge Incident Tracking Form**

ILLICIT DISCHARGE INCIDENT REPORTING FORM

Incident ID			Logged By:		
Location, Nearest Street Address,:				Outfall #	
				Latitude	
				Longitude	
Reported by:				Date:	
Contact Info					
Discharge Type:	☐ Sewer Overflow ☐ Sewer Connection		☐ Spill ☐ Dumping		☐ Wash ☐ Other
Incident Description:					
Area Impacted	☐ Stream/River (name) _____ ☐ Upland (name) _____		☐ Wetland (near) _____ ☐ Other _____		
Stormwater System Impacted	☐ Catchbasin (ID #) _____ ☐ Drain Manhole (ID #) _____ ☐ Surface Basin (ID #) _____		☐ Subsurface Basin (near) _____ ☐ Outfall (ID #) _____ ☐ None		
Recent Rain:					
Add. Info:					

AREA ACTIVES – POSSIBLE CAUSE OF ISSUE

Dumping:	☐ Yes ☐ No	Oil/Chemicals	☐ Yes ☐ No	Sewerage	☐ Yes ☐ No
Septic System:	☐ Yes ☐ No	Wash Water:	☐ Yes ☐ No	Staining	☐ Yes ☐ No
Other:				Suds:	☐ Yes ☐ No

INDICATORS OF POTENTIAL ISSUES – FURTHER INVESTIGATION RECOMMENDED

Odor:	☐ None ☐ Sewer ☐ Eggs ☐ Petroleum ☐ Laundry ☐ Unknown				Floatables	☐ Yes ☐ No
Oil Sheen:	☐ Yes ☐ No	Cloudy::	☐ Yes ☐ No		Staining	☐ Yes ☐ No
Other:					Suds:	☐ Yes ☐ No

SUSPECTED VIOLATOR KNOWN: ☐ YES ☐ NO

Name		Address	
Description		License Plate	

ILLICIT DISCHARGE INCIDENT INVESTIGATION REPORT FORM (CONT.)

LOCATION MAP/SKETCH/PHOTOS

RESPONSE ACTION(S)

Date Investigated:		Investigator:	
☐ No Investigation		Reason:	
☐ Referred to another Department		Department	
☐ Investigated – No Action Required	Action Description		
☐ Investigated – Action Required			
☐ Action Completed	Date:		
☐ Incident Closed	Date:		

Notes:

APPENDIX H

- SSO Inventory

SANITARY SEWER OVERFLOWS (SSOs) INVENTORY

Location (Approximate street crossing/address and receiving water, if any)	Discharge Statement (Clear statement of whether the discharge entered a surface water directly or indirectly)	Date & Time of Event		Estimated Volume (gal)	Description (indicate known or suspected cause)	Mitigation Completed (include dates)	Mitigation Planned (indicate schedule)
		Start	Stop				
HULL WPCF - 1111 Nantasket Ave.	Ground Surface	5/1/2015 8:30 am	5/1/2015 1:15 pm	Less than 100 gallons	Sludge spill occurred onto asphalt driveway due to improper filling of sludge tanker truck	Plant staff and Hoadley/Sewer Tech in to clean up asphalt area, SOP developed for truck filling.	
14 Vautrinot Ave	Ground Surface	6/10/2015 10:49 am	6/10/15 4:00 pm	Less than 30 gallons	Sewer line blockage – broken brick/debris – able to get partial flow through sewer line until repaired. Found improper sewer main construction	Line repaired by contractor	
11 Highland Ave	Ground Surface	6/21/15 8:00 pm	6/21/15 11:40 pm	Less than 35 Gallons	Sewer line blockage at manhole – Debris removed and line jetted/flushed	Vacuumed and Jetted	
9 Highland Ave	Ground Surface	7/2/15 7:30 am	7/3/15 9:00 am	Less than 20 Gallons	Sewer line blockage	Contractor excavated and repaired broken pipe	
Pump Station 9 – 165 Main St	Ground Surface	7/16/15 3:30 PM	7/16/15 3:31 PM	Less than 20 Gallons	Spill onto asphalt parking area in front of building while attempting to test portable bypass trash pump	Liquid evaporated from surface; procedures developed for equipment set up	
HULL WPCF - 1111 Nantasket Ave.	Ground Surface	7/31/15 7:30 am	7/31/15 7:35 am	Less than 750 gallons	Blockage at sludge blend box before gravity thickener.	Vacuumed – washed down and clean	
HULL WPCF - 1111 Nantasket Ave.	Ground Surface	8/17/15 8:00 am	8/17/15 8:00 am	Less than 50 gallons	Sludge spill occurred onto asphalt driveway due to improper filling of sludge tanker truck	Area cleaned – updated truck filling procedures	
245 Nantasket Ave	Ground Surface	11/5/15 ??	11/5/15 6:00 pm	Undetermined	Broken sewer pipe lateral due to area excavation by gas utility – Pipe was temporarily repaired to minimize leakage	Contractor repaired broken pipe on 11/7/15	
Pump Station A 45 Valley Beach	Ground Surface	11/25/15 10:30 am	11/25/15 10:30 am	Less than 15 gallons	Spill onto ground area next to building, while attempting to set up portable bypass trash pump	Review SOP for procedures at this station and updated	
25 Main Street	Ground surface no release to surface water	2/19/2016 9:15 am	2/19/16 11:15 am	5 to 10 gallons on surface area	Blockage in lateral from house to main	Repair completed on 2/22/16	
13 Rockland Circle Pump Station #3	Ground surface no release to surface water	3/15/16 10:15 am	3/15/16 10:16 am	2 gallons to ground surface, 8 gallons in valve box	Valve exercising for the force main isolation valve that was stuck open	Applied lime to area around the gate box and gate box was vacuumed – valve closed 3/15/16	
28 Winthrop Ave	Backup in basement of home	3/29/16 1:27 pm	3/29/16 1:27 pm	25 to 50 gallons in basement	An inspection of manholes showed MH 20169 had debris in it that may have inhibited flow from residence	Manhole cleaned out by Rosano Davis 3/29/16	

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1111 Nantasket Ave – Treatment Plant	Ground surface no release to surface water	4/16/16 8:30 am	4/16/16 8:32 am	50 to 75 gallons	Planned separation of piping that had been rented for emergency back-up pumping from influent wetwell to primary box	Release was immediately stopped by raising up pipes. Called in vactor truck to assist with disassemble and draining of pipes	
510-538 Nantasket Ave	Back up in basement – leaking grease interceptor and sump pump in floor was pumping to the outside	5/14/16 2:30 pm	5/14/19 3:00 pm	20 to 30 gallons	Grease and debris blockage in owner's sewer line	Owner had Mr Drain clean the building sewer line	
35 Elm Ave	Ground surface no release to surface water	6/5/16 possible – reported to the sewer dept 6/7/16 11:56 am	6/7/16 2:00 pm	unknown	Electrical failure of control panel to the owners grinder pump	Electrical panel replaced on 6/8/16	
1111 Nantasket Ave Treatment Plant	Ground surface no release to surface water	7/26/16 10:00 am	7/26/16 10:02 am	Less than 20 gallons	Operator error. While exercising large influent pumps that discharge to the 16-force main, wetwell go too high and multiple pumps came on which caused the overflow	Developed SOP for this daily task	
194-206 Atlantic Ave.	Discharge entered two storm drains which flow to Straits Pond.	12/19/16 8:54 am	12/19/16 10:15am	250 gallons	8-inch gravity sewer line blockage due to grease	Pump out of sewer manhole to stop overflow, then jetted 700 ft of sewer line	
26 Western Ave	Ground surface no release to surface water	12/30/16 12:30 pm	12/30/16 approx. 4:00pm	Estimated 360 gallons – all contained within the garage	Sewer line blockage just downstream of the lateral connection – grease and debris	Sewer line was excavated, and blockage cleared. Sewer line was repaired and a cleanout was added. [1/5/17]	
76 Atlantic Ave	Ground surface no release to surface water	Reported on 3/8/17	3/8/2017 2:00 pm	Unknown – no means to determine how there has been an issue	Backup into property – back up was on to the ground from a failed Fernco rubber coupling	Pipe replacement on 3/9/17	
1111 Nantasket Ave Treatment Plant	Ground surface and to catch basis adjacent to the chlorine contact tanks	4/1/17 2:00 pm	4/1/17 4:45 pm	Estimated 10,000 to 15,000 gallons	Rain Event and high storm tide levels/surge caused the capacity of the gravity outfall to decrease below the effluent flow pumped to the chlorine contact tank –	Spilled wastewater was fully treated	
1111 Nantasket Ave Treatment Plant	Ground Surface – Initially to surrounding ground and then flowed toward Duck Lane and the two catch basins	5/31/17 2:30 pm	5/31/17 2:40 pm	700 Gallons	Plant influent flow surge from upstream cleaning plug removal caused slug of flow to WWTF. With both primary clarifiers off line, the allowable flow through the structure was exceeded and the D-box level rose above the grating and sewerage spilled over	Influent pump flow rate was immediately decreased to stop the overflow. A vactor truck immediately clean out nearby catch basins	
262 Atlantic Ave manhole	Ground surface no release to surface water	12/15/17 11:30 am	12/15/17 12:00 pm	Less than 10 gallons	Manhole surcharged due to grease	Manhole pumped out	
36 J Street	Ground surface no release to surface water	1/25/18 1:50 pm	1/25/18 5:00 pm	Less than 25 gallons	Back up into home caused by blocked manhole	Vactor truck jetted and vacuumed up debris and cleared the sewer line	

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1111 Nantasket Ave Treatment Plant	Ground surface and to adjacent catch basins	3/3/18 12:00 pm	3/3/2018 4:03 pm	25,000 gallons	Rain event and astronomical high tides and tidal surge caused the capacity of the gravity outfall to decrease below the effluent flow pumped to the chlorine contact tank –	New head works/influent isolation gate was throttled down to reduce flow Spilled wastewater was fully treated	
83 Main Street	Catch basin to Receiving Waters	3/5/18 5:00pm	3/6/18 10:30 am	Less than 50 gallons	Leak due to blockage from lateral cleanout on the side of Main Street	Blockage cleared by drain cleaning company	
42 Valley Beach – Pump Station	Ground surface no release to surface water	3/13/18 7:15 pm	3/13/18 7:18 pm	Less than 100 Gallons	Station power loss issue – while pumping down with portable trash pump the discharge hose on the pump broke apart.	Coordinated for another portable generator from rental company	
24 Meade Ave	Ground surface no release to surface water	4/20/18 8:15 am	4/20/18 9:15 am	Less than 20 gallons	Blockage due to rocks, brick fragments and debris in line/manhole	Vactor truck vacuum and cleaned lines	
24 E Street	Ground surface no release to surface water	5/3/18 7:37 am	5/3/19 10:15am. Unknown, since no access to home	Reported as zero, since contained in shower, and extremely small volume that had receded.	Back up into downstairs shower at property. Found a blockage at MH 20283 – L street playground	Cleared line – homeowner rinsed and cleaned shower	
Newton/Main Street	Ground surface no release to surface water	5/26/18 12:30	5/26/18 7:45 pm	Less than 75 Gallons	Combination of blockage, clay VP pipe break and roots caused the backup	Clay pipe replaced with new PVC.	
Pump Station A Valley Beach Rd	Ground surface no release to surface water	6/12/18 8:00 am	6/12/18 8:30 am	Less than 50 Gallons	Broken drain back valve that broke during valve exercise	Contractor made repair	
10-12 Rockaway	Ground surface	7/30/18 10:45am	7/30/18 11:35am	Less than 40 gallons	E1 Grinder pump failed – pump chamber contained a lot of solids, grease and plastics	Pump chamber pumped out and new replacement pump was installed	
1111 Nantasket Ave – Treatment plant	Ground surface – asphalt driveway	8/8/18 8:10 am	8/8/18 8:11 am	30 gallons	Operator error – truck driver was monitoring filling of truck using the truck's sight glass, which did not indicate adequately how full the tanker truck was.	Sludge pump turned off – sandbags were set up to contain contents, material was vacuumed up	
121 Nantasket Ave	Catchbasin to receiving water ground surface, direct to receiving water, backup into basement	9/18/18 12:25 pm	9/18/18 1:25 pm	Estimated 600 gallons	Rain Event 2.93 inches Surcharged manhole, pump station Backup into property	Water dissipated	
Pump Station 4 – marginal road	Ground Surface	5/15/19 6:43 pm	5/15/19 9:00 pm	Estimated 500 gallons	Force main Pipe Collapse	SSO was immediately stopped by shutting the pump station pumps off and draining the force main back into the wetwell. Emergency response plan initiated for repairs, bypass pumping and clean up All failed piping and fitting replaced with new components	
407 Nantasket Ave	Ground Surface	6/7/19 11:00 am	6/8/19 9:00 am	1,000 gallons	Blockage of the sewer lateral at the sewer main connection caused by Rags and wipes	New service connection made and cleanout installed	

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7 Douglas Ave	Ground Surface	7/14/19 1:00 pm	7/14/2019 2:30 pm	5 to 10 gallons	Blockage in 3" sewer lateral connected to small manhole	Pumped out manhole to stop leakage on 7/14 – line cleaned on 7/15.	