

Dry Weather Field Screening

North Central Texas Regional Protocol



This manual was produced by the North Central Texas Council of Governments on behalf of the Regional Stormwater Monitoring Coordinating Council (RSWMCC).



**North Central Texas
Council of Governments**

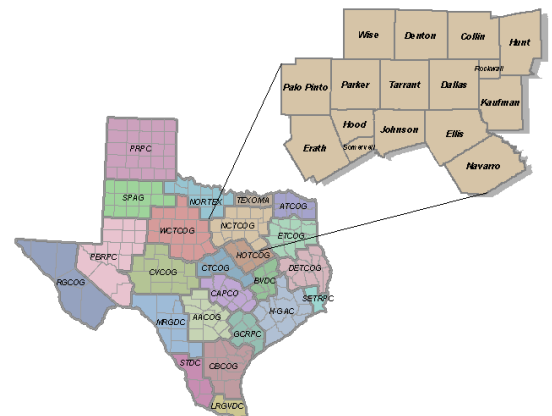


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Introduction

What is Dry Weather Screening?

Dry weather screening is a field test method for inspecting storm water drainage areas to help locate and identify harmful and illegal discharges and improper connections to a municipal storm water system. The method couples visual observations with simple water quality analysis to obtain clues regarding potential illicit discharges and their source(s). Inspecting a storm drainage system during dry weather can be an effective way to find illicit discharges since there should not be any water flowing during dry weather. For this reason, many operators of municipal separate storm sewer systems (MS4s) institute a dry weather field screening component as part of their overall Storm Water Management Program (SWMP).

In the field, testers record basic characteristics of individual storm drain outfalls, evaluate suspect outfalls, and assess the severity of illicit discharge problems in a community. There are several parameters that can indicate the presence and origin of an illicit discharge. A field sampling kit can be used to conduct tests on water samples to detect the presence of parameters such as copper, chlorine, ammonia-nitrogen, and detergents. Other tests that should be performed out in the field are conductivity, turbidity, temperature, and pH. By running these tests, field personnel can identify potential pollutants which can then help locate the source of the illicit discharge through back-tracing. Although field screening is designed primarily for testing discharges from a storm water conveyance during dry weather, the method is also appropriate for detecting water quality problems in any urban waterway.

Permit Requirements

Many municipalities, counties and other governmental entities in Texas have been required by the Texas Commission on Environmental Quality (TCEQ) to obtain a Texas Pollution Discharge Elimination System (TPDES) permit from the TCEQ to discharge storm water to “surface waters in the State.” The regulations were promulgated in two phases.

In 1990, cities with a population greater than 100,000 were designated as “Large and Medium MS4s”. They were required to apply for individual permits with specific dry weather screening requirements, and must address these in their annual report to TCEQ. Large and Medium MS4s in North Central Texas have developed methods and procedures for conducting dry weather field screening over the years and this document draws much from their collective knowledge and experience.

In 2007, the remaining urbanized area “Small MS4s” were issued a TPDES general permit by the TCEQ, and it was updated in 2013. Part III.B.2(a)(1) of this general permit states that “*all permittees shall develop, implement and enforce a program to detect, investigate, and eliminate illicit discharges into the small MS4s. The program must include a plan to detect and address non-stormwater discharges, including illegal dumping into the MS4 system.*” The regulations leave it open to each permittee to decide how best to address this requirement, with the exception of Level 4 Small MS4s. Part III.B.2(e)(2)(a) of the general permit states: “*By the end of the permit term, permittees who operate Level 4 small MS4s shall develop and implement a written dry weather field screening program to assist in detecting and eliminating illicit discharges to the small MS4. Dry weather field screening must consist of (1) field observations; and (2) as needed, field screening.*” Since conducting dry weather inspections can be a practical way to find illicit discharges, several Level 1-3 Small MS4s have instituted a dry weather screening program as part of their individual SWMPs, in addition to the Level 4 MS4s that are meeting their permit requirements. Many of them have sought guidance on the best methods to train staff on these methods.

What is the Regional Protocol?

The contents of this training document constitute the Regional Protocol for Dry Weather Field Screening in North Central Texas. The Regional Protocol was developed by the North Central Texas Council of Governments (NCTCOG) under the direction of the Regional Storm Water Management Coordinating Council (RSWMCC) to provide local entities with a consistent method for detecting illicit discharges. NCTCOG staff, along with Regional Storm Water Program members, evaluated existing municipal programs and incorporated those tests and methodologies that were most effective in the North Central Texas region in the Regional Protocol. Common testing methods and training promote consistency throughout the watershed, intensifying the level of impact across the region.

Training Overview

Training on the Regional Protocol is provided through the Dry Weather Field Screening Workshop offered as a component of the Regional Storm Water Management Program. For the past several years, the training has been conducted by staff from the City of Fort Worth and thus incorporates some of their field screening and investigation procedures. Instruction in Global Positioning Systems (GPS) and outfall mapping techniques were added to the curriculum, courtesy of the City of Denton staff.

Classroom Portion

The classroom portion of the workshop provides a hands-on instructional session using a field test kit. Working in groups of four or less, class participants are taken through various test methods, perform water quality measurements, practice chemical handling safety and learn quality control procedures. The instructor first demonstrates various water quality tests, then the participants have the opportunity to perform the tests themselves. Strict adherence to safety procedures is maintained at all times.

Field Portion

During the field portion of the workshop, the class participants practice the monitoring procedures as well as collect location information using a GPS receiver at a nearby waterbody or storm drain outfall. Field safety measures are emphasized. During the field training exercises, the instructor allows the participants to conduct the water quality tests with minimal supervision while he/she observes the participants' procedures, answers questions, and corrects any obvious mistakes. The importance of following proper sampling techniques to assure monitoring data quality is also addressed.

At the time of publication, NCTCOG is working with the Illicit Discharge Detection and Elimination Task Force to produce intermediate and advanced training related to the dry weather field screening protocol, as outlined in the Task Force's FY17 Work Program.

Getting Ready to Sample

Locating Your Site

According to the TPDES, all regulated MS4s are required to locate and map their storm sewer outfalls. There are several methods that can be used to determine the location of outfalls. The two types of methods discussed in the manual are the Global Positioning System (GPS) surveying and map estimating methods.

Make absolutely certain that you obtain permission from the landowner before entering any private property.

Global Positioning System (GPS) Survey Method

GPS units come in a variety of models suitable for almost any budget. Advantages of GPS units are that they are easy to use, light weight, and can quickly and accurately determine positions.

Every GPS unit will have different functionalities depending on the brand and model but here are some general instructions to follow when conducting an outfall inventory:

- First, follow the manufacturer's instructions on how to initialize your handheld GPS device prior to first use.
- Allow your unit to receive satellite signals for about 5 to 10 minutes when you first turn it on. This will allow it to download all of the relevant data it needs about the area.
- Avoid standing near things that could block or bounce the signal. Buildings, hills, rock formations, trees, heavy vegetation and bridges can affect the signal received from the satellite. Hold the unit at arm's length, level with your shoulder, so your body does not interfere with the signal quality.
- Record a waypoint as close as you can safely get to an outfall. Generally, you can save your current position by selecting the "Mark" key. This key is usually labeled with a star or check-mark. The GPS receiver will prompt you to enter a name or accept the receiver-generated name for your selected waypoint.
- After the field work is performed, the data from the GPS should be downloaded to a desktop computer for incorporation into a mapping program.

Map Survey Method

Field crews can also use MAPSCO or U.S. Geological Survey (USGS) topographic maps (scale of 1:24,000) to conduct outfall inventories. MAPSCO books are readily available and easy to use in locating streets and reference points through a grid system. They also include street block numbers, zip codes, city/county names, and points of interest such as airports and golf courses. Topographic maps can be obtained directly from the USGS. These maps typically include elevation contours, symbols to identify man-made features, and shading to represent forested or urbanized areas. USGS maps also include latitude and longitude, community or city names, and highways and major streets. The low equipment cost and simplicity of use are the main

advantages of this method; however, the accuracy of using a map can be questionable in areas with few reference points on the map. The most recent version of a map should be used when referencing outfalls since some features, either natural or man-made, may have changed.

At least two field personnel are needed to conduct an outfall inventory. A three-person crew is optimal and facilitates simultaneous tracing of the storm system. The only difference between the GPS and map method is that the crew members will estimate their position by placing a point on the map to represent their approximate location instead of taking a GPS reading. Field crews can more accurately determine their position by using nearby reference points on the map to take distance and compass measurements. Once you have identified your outfalls by either using a GPS or map, you can branch out into the next phase of evaluating your system. An effective IDDE program not only involves locating and documenting outfalls but also determining certain physical characteristics of the outfalls and the quality of water being discharged.

Making Field Observations using the Outfall Reconnaissance Inventory (ORI)

The Center for Watershed Protection (CWP) has developed the ORI process for conducting field assessments of storm sewer outfalls. The ORI is designed to record basic characteristics of individual storm drain outfalls, evaluate suspect outfalls, and assess the severity of illicit discharge problems in a community. Field crews should walk all natural and man-made stream channels with constant and intermittent flow, even if they do not appear on available maps. The goal is to complete the ORI on every stream mile in the MS4 starting with priority subwatersheds. The ORI results can then be used to help guide future outfall monitoring and discharge prevention efforts.

Field Sheets

ORI field sheets can be used to record descriptive and quantitative information about each outfall inventoried in the field. Data from the field sheets represent the building blocks of an outfall tracking system to improve Illicit Discharge Detection & Elimination (IDDE) monitoring and management. An example of an ORI field sheet is available in [Appendix B](#) of this manual. It was adapted from the CWP's IDDE Guidance Manual.¹

The following paragraphs include instructions for recording data on the ORI, however, communities often choose to record data with their GPS units or other forms. Refer to your standard operating procedure for your community's preferred method.

Completing the ORI

When field crews are performing an ORI, they should record the spatial location of the outfalls with a GPS unit and physically mark them with spray paint or other permanent marker. Crews should also photograph each outfall and characterize its dimensions, shape, and component material, and record observations on basic sensory and physical indicators. Additional flow and water quality data should be collected if dry weather flow occurs at the site. Field crews can measure indicators such as temperature, pH, and ammonia at flowing outfalls. The ORI field sheet is divided into six sections that address both flowing and non-flowing outfalls. The following paragraphs can be used as guidance on completing the sections of the ORI field sheet.

¹ *Illicit Discharge Detection & Elimination: A Guidance Manual for Program Development and Technical Assessments*, CWP & Pitt, Robert, October 2004.

Background Data

Section 1 of the ORI field sheet is used to record basic data about the survey, including the date and time, GPS coordinates for the outfall, jurisdiction and subwatershed of where the outfall is located, and past/current weather conditions. This section is used to create an accurate record of when, where, and under what conditions the ORI data was collected. Field crews should take a digital photo of each outfall and record photo numbers in Section 1 of the field sheet. A unique identification number should be written directly near the outfall. This can serve as its subwatershed “address.” Markings help crews confirm outfall location during future investigations and give citizens a better way to report the location of spills or discharges when calling a pollution hotline.

Outfall Description

Section 2 of the ORI field sheet is mainly for basic outfall characteristics. These include whether the outfall is closed or open drainage, what material the outfall is made of, the shape of the outfall, whether there is a presence of flow at the outfall, and the pipe’s dimensions. This section also asks if the outfall is submerged in water or obstructed by sediment and the amount of flow, if present.

Quantitative Characterization for Flowing Outfalls

Section 3 of the ORI field sheet records direct measurement of flowing outfalls such as flow, temperature, pH, and ammonia. Field crews can measure the rate of flow using one of two techniques. The first technique simply records the time it takes to fill a container of a known volume, such as a one-liter sample bottle. If you decide to use this method, your results should be recorded under the *Results* column and as part of the *Flow #1* technique on the ORI field sheet. In the second technique, the crew can measure the velocity of flow and multiply it by the estimated cross sectional area of the flow. The results of this method should be recorded as part of the *Flow #2* technique on the ORI field sheet. When measuring flow, field crews may also want to measure the quality of the discharge using relatively inexpensive meters and test strips. When meters or strips are used, measurements should be made from a sample bottle that contains flow captured from the outfall. The exact measurement should be recorded in Section 3 of the ORI field sheet.

Physical Indicators for Flowing Outfalls Only

Section 4 of the ORI field sheet records data about four sensory indicators associated with flowing outfalls. These four indicators are odor, color, turbidity, and floatables. Sensory indicators do not always reliably predict illicit discharge because they can result in a “false negative.” This means that our sensory indicators may sometimes fail to detect an illicit discharge when one is actually present. However, sensory indicators can be important in detecting the most severe or obvious discharges. Section 4 allows the field crew to indicate the severity of the discharge on a scale from one to three.

Physical Indicators for both Flowing and Non-flowing Outfalls

Section 5 of the ORI field sheet examines physical indicators found at both flowing and non-flowing outfalls that can reveal the impact of past discharges. Physical indicators include outfall damage, outfall deposits or stains, abnormal vegetation growth, poor pool quality, and benthic growth on pipe surfaces. Many of these physical conditions can indicate that an intermittent or transitory discharge has occurred in the past even if the pipe is not currently flowing.

Overall Outfall Characterization

Section 6 of the ORI field sheet allows field crews to designate the severity of the illicit discharge by indicating the discharge as being obvious, suspect, or having the potential to be illicit. This is all dependent on the number and severity of discharge indicators checked or circled in preceding sections. This section is basically an overall rating of the outfall.

It is important to keep in mind that the Outfall Reconnaissance Inventory process is only an initial determination of discharge potential. A more certain determination is made using a more sophisticated indicator monitoring method. Nevertheless, the ORI gives storm water management staff a better understanding of the distribution and severity of illicit discharge problems within their community.

Scheduling Sampling Time

A sampling event consists of two sampling visits made within 24 hours but at least four hours apart. You may sample more frequently if you want to or if you happen to observe unusual conditions at your site. **Remember, you should not sample if it has rained significantly (>0.1 inch) in the last 72 hours.** Since the primary thing you are trying to detect with your field kit is illicit discharges into your storm drain system, it is a good idea to vary the time and day you sample. Just be sure you sample once in a month (that is two visits).

If conditions are unsafe for any reason and you cannot sample safely, DO NOT SAMPLE.

Sampling Safety

General Precautions

Read all instructions to familiarize yourself with the test procedure **before you begin**. Note any precautions in the instructions. Read the label on each reagent container before use. Some containers include precautionary notices or Material Safety Data Sheets (MSDS) that provide important safety information.

WARNING: Reagents marked with the ⊕ symbol are considered hazardous substances. Copies of Material Safety Data Sheets (MSDS) are supplied for these reagents in Appendix D. For your safety, read labels and accompanying MSDS before using.

Keep all equipment and chemicals out of the reach of young children.

In the event of an accident or suspected poisoning, immediately call the Poison Control Center emergency phone number (800) 222-1222. This number is also listed on the inside front cover of most phone books. Be prepared to give the name of the reagent in question and its manufacturer's code number.

LaMotte reagents are registered with POISINDEX™, a computerized poison control information system available to all local poison centers.

Always perform water sampling with a partner.

Protect Yourself and Your Equipment

- Avoid contact between chemicals and skin, eyes, nose and mouth.
- Wear safety goggles or glasses and rubber gloves when handling chemicals.
- Use the test tube caps or stoppers, not your fingers, to cover test tubes during shaking and mixing.
- When dispensing a chemical from a dropper or pipet, hold the dropper vertically upside-down (not at an angle) and squeeze it gently.
- Do not use the test kit as a test tube holder when you are dispensing chemicals. Some of the reagents will damage the interior of the kit if spilled.
- Wipe up any chemical spills, liquid or powder, as soon as they occur. Rinse area with a wet sponge, then dry.
- Thoroughly rinse test tubes before and after each test with tap water. Dry your hands and the outside of the tubes.
- After use, tightly close all chemical containers. Do not switch caps.
- Do not expose chemicals and equipment to direct sunlight for long periods of time.
- Protect chemicals and equipment from extremely high or low temperatures.
- Safely dispose of all waste chemicals in the sanitary sewage system. Do not dump them on the ground or in the water outside.

Some reagents can be considered hazardous substances and must be disposed of properly. Refer to the MSDS for more information.

Site Safety

- Park your vehicle safely off roads and out of the way of traffic. Watch out for traffic.
- Approach your site carefully! Watch out for traffic on bridges and when crossing roads. Be on the lookout for snakes, fire ants, wasps, poison ivy, Africanized honeybees, wild animals or briars.
- Avoid high water - sample another day if conditions are dangerous.

Equipment List

- √ Armored thermometer, centigrade
- √ pH Meter
- √ Octa-Slide Comparator
- √ Conductivity Meter
- √ Storm drain test kit with tests for copper, chlorine, phenols, and detergents
- √ Ammonia-Nitrogen test kit
- √ Gloves for handling chemicals
- √ Safety goggles
- √ Container for bringing back liquid reagent wastes from the field
- √ Bottle of deionized or distilled water for rinsing equipment after sampling
- √ Paper towels or rags
- √ Data Form and/or GPS unit
- √ Metric tape measure or ruler
- √ Camera

USE OF THE OCTA-SLIDE COMPARATOR

For optimum color comparison, the Octa-Slide Viewer (1100) should be held so non-direct light enters through the back of the comparator. With sample tube inserted at top, slide the color bar through the viewer and match with color standards. It is helpful to hold a white sheet of paper behind the viewer at about a 45° angle so the light can reflect off of the paper into the viewing tube. Do not block the light with your hand or with the paper.

It is important to keep the viewing tube as clean as possible. Always dry the outside of test tubes before you insert them into the Octa-Slide Comparator. Also, prevent getting the outside of the comparator dirty as much as possible. Never touch the color bars with your fingers.

Suggested Sampling Sequence

1. pH meter calibration
2. Initial site observations: trash, sewage, surface scum, etc.
3. Air temperature
4. Physical observations: flow, color, turbidity, odor, oil sheen
5. Water temperature
6. pH
7. Detergent
8. Phenols
9. Ammonia-Nitrogen
10. Copper
11. Chlorine
12. Conductivity

Initial Observations

Flow Level Measurements

It is important to know what the normal dry-weather flow is at your site. With this information, discharges into the system can be more easily observed as an increase in flow.

Before you travel to your site, note whether it has rained more than 0.1 inch in the last 72 hours. If it has, do not sample.

1. Record your outfall and site dimensions on your data form. If you are sampling in a drainage ditch, make a note of its dimensions.
2. Record the type of materials used to construct your site. For example, is it a concrete or metal pipe? Is it a concrete-lined ditch or a natural, dirt-bottomed drainage?
3. Record your site access information. How do you enter the ditch or approach the outfall, and how do you capture your sample? For example, you might capture your sample as it flows out of a pipe, or you might capture your sample at a depth of five inches as it flows in a ditch.

Outfall and site dimensions, construction materials and access information only need to be recorded on your initial visit to the site. These measurements should not change between sampling events.

4. Record whether there is flow at your site.
5. Measure flow depth as close to the end of the pipe as possible. If this is not possible due to safety considerations, estimate the depth at the deepest point. Record this measurement in centimeters.
6. Measure the width of the water in the pipe or ditch. A sketch of the dimensions of the outfall or ditch, with dimensions of flow depth and width, might be helpful. Record width measurement on your data form in meters and take pictures to document the site.

Methods of Water Sample Collection

There are three accepted methods for collecting water samples:

1. **Discharge Grab** - Always rinse your test tubes or sampling containers twice with the water to be sampled. Collect your sample by putting your sampling container under the discharge of the outfall. If you are using this method wear safety gloves.
2. **Surface Water Grab** - Again, rinse your test tubes or sampling containers twice with the water to be sampled. If deep enough, collect at a depth of one foot under the surface. Lower your container vertically to a depth of about 0.3 meters (one foot or about elbow deep), and then turn the container upright. Rinses should be done at the same depth you are sampling. Approach your site from downstream of any flow, so as not to disturb the sampling site. If there is a current, be sure you are standing downstream of your container. Be sure not to drag the container on the bottom or kick up sediment into your sample.
3. **Bucket Grab** - Rinse your bucket twice with the water to be sampled. Dispose of rinse water away from where the actual sample will be taken. Gently lower the bucket 0.3 meters (one foot or about elbow deep) into the water or to one-third of total depth, whichever is less, and fill. Retrieve and take samples in your test tubes or sampling containers directly out of the bucket. Be sure and rinse those containers twice before collecting sample to be tested.

Monitoring Procedures - Tests and Observations

Conductivity

Conductivity is a measure of the ability of the water to pass an electrical current and is affected by the presence of inorganic substances or dissolved solids. Dissolved solids in water dissociate into ions with the ability to conduct electrical current. As the level of total dissolved solids (TDS) rises, the conductivity will also increase. There are a wide variety of inorganic substances or dissolved solids like sodium, chloride, sulfate, calcium, bicarbonate, nitrates, phosphates, iron, magnesium, etc. in water solutions. All of these materials at certain concentrations are essential for life and all have the ability to carry an electrical current. These substances affect the flow of materials in and out of the cells of organisms living in the water and they may also be used as energy sources for certain organisms. They also serve as the parts of molecules necessary for building new cells.

In very general terms, water with high concentrations of dissolved solids (such as seawater) is considered salty and has a high level of conductivity. Water with low concentrations of dissolved solids is considered fresh. Inorganic materials in water are generally determined by the geology of the watershed. For example, if the soil and rock formations are composed of limestone, water draining this watershed will probably be high in calcium, magnesium, and carbonate - the common constituents of limestone.

Fluctuating levels of dissolved solids and conductivity can be indicators of pollution from a number of activities. Examples of these activities include wastewater discharges that may be high in salts such as brine waters from oil production activities, as well as irrigation, increased evaporation in streams due to removal of streamside vegetation, overuse of fertilizers, or the spreading of road salt during icy conditions.

Salt pollution is a problem because it can cause the salt levels of drinking water supplies to rise above recommended levels for human consumption. In some areas, it can cause rivers or streams to become unsuitable for agricultural irrigation or industrial use. Increasing levels might also impair aquatic life in ways that are difficult to determine.

Measuring Conductivity

Conductivity is measured in micromhos per centimeter ($\mu\text{mhos/cm}$) or microsiemens per centimeter ($\mu\text{mS/cm}$). Micromhos (μmhos) and microsiemens (μmS) are equivalent units of measure, and can be used interchangeably. Distilled water has a conductivity range of 0.5 to 3 $\mu\text{mhos/cm}$. Conductivity (or total dissolved solids) can be recorded using the TDS Tester 3 or 4. Which meter you use depends on the type of water you are sampling. As a rule of thumb, most freshwater measurements are best made with a TDS Tester 3 (or equivalent) low conductivity range meter that measures from 0 to 1990 $\mu\text{mhos/cm}$. For measuring in bays, estuaries, and certain areas where ground water is particularly high in dissolved solids (far north and west Texas) a TDS Tester 4 with a range of 0 to 19.90 ppt will be necessary.

Conductivity Meter Calibration

There are two primary methods for calibrating a conductivity meter; however, you should follow whatever calibration method is recommended by the manufacturer of your particular meter.

In the first method, the tester records the temperature of the conductivity standard during calibration to ensure the standard has not been exposed to temperature extremes.

In the second method, the tester performs a post-calibration of the meter without recording the temperature of the conductivity standard. Both methods adequately ensure the validity of the measurement.

Calibration is performed using a standard solution consisting of potassium chloride or sodium chloride mixed with deionized water. It is not toxic or hazardous. For both calibration methods mentioned above, the temperature of the conductivity standard solution should be stable. For this reason, it is recommended the calibration and post-calibration be performed in the lab at room temperature. Storing the standard in the trunk of a car or in a garage can interfere with proper pre- and post-calibrations, resulting in unreliable measurements.

Quality Control Check

Conductivity calibration can be performed up to 24 hours in advance of the sampling event, but it is recommended that this procedure be performed immediately before going into the field.

Test Method #1:

Step 1: Remove the protective cap from your conductivity meter.

Step 2: Rinse the beaker (and thermometer if performing the calibration method involving temperature) and meters probe twice with a small (1.5 oz) volume of conductivity standard.

Step 3: Dip the meter in conductivity standard solution to a point just below the meter's immersion indicator line.

Step 4: Stir gently and check to make sure there are no small air bubbles trapped on the bottom of the probe. If there are air bubbles, they can be removed by tapping the bottom of the probe against the side of the beaker while the bottom of the probe is under water.

Step 5: Turn the meter on.

Step 6: When the conductivity meter is first placed into the solution, the readings might initially increase or decrease as the meter reacts to the temperature difference between the meter and the calibration solution. Wait 2 minutes to allow the temperature sensor to fully compensate for this difference.

Step 7: If applicable, record the temperature after 1.5 minutes in the *Calibration* box and remove it from the beaker. Record the value of your conductivity standard under the column entitled *Standard Value* on the data form.

Step 8: After two minutes, read and record the meter reading on the data form under the column entitled *Initial Meter Reading*.

Step 9: If the conductivity meter is not reading the same value as the standard solution, you will need to adjust the meter. On many conductivity meters, there is a calibration screw located on the back of the meter that you can adjust with a small screwdriver. When adjusting, be careful not to dislodge the screw. Again, you will need to follow the manufacturer's specific instructions on calibration adjustment for your particular instrument.

Remember to make sure the meter is at least one centimeter above the bottom of the cup and that there are no bubbles on the bottom of the meter. The meter should be calibrated to read the same as the value of the standard solution to the nearest 10. The final meter reading should be recorded on the data form in the *Calibration* box under the column entitled *Meter Adjusted To*.

Step 10: Turn the meter off and remove from the solution. Shake the excess standard solution from the meter, rinse with distilled or deionized water, and replace the cap. Periodically soak or swab probes with alcohol.

Step 11: If using the post-calibration method, keep the calibration standard for use during a post-test conductivity reading after sampling. Ensure the standard does not become contaminated between the readings.

Quality Control Check

Some conductivity meters are not waterproof or even water resistant. Be very careful to protect against moisture, especially during damp conditions. Meters will not work properly if moisture gets inside.

Test Method #2:

Step 1: Remove the cap from the meter and rinse the sample beaker and the meter twice with the water from the same location and depth as the water to be sampled. Throw the rinse water downstream or up on the shore to avoid affecting your sample.

Step 2: Collect the sample and place the meter in the beaker, being careful not to immerse below the meter's immersion indicator line. Check the bottom of the meter to make sure there is not an air bubble trapped on the bottom.

Step 3: Turn the meter on, wait 2 minutes, and read the meter display. Make sure the beaker with sample and meter are out of direct sunlight and protected from rapid temperature changes. Remember that the meter must be at least one centimeter above the bottom and not touching the sides of the beaker when you make your reading.

Temperature

Celsius/Fahrenheit Conversions

°C	°F	°C	°F	°C	°F
0	32.0	13	55.4	26	78.8
1	33.8	14	57.2	27	80.6
2	35.6	15	59.0	28	82.4
3	37.4	16	60.8	29	84.3
4	39.2	17	62.6	30	86.0
5	41.0	18	64.4	31	87.8
6	42.8	19	66.2	32	89.6
7	44.6	20	68.0	33	91.4
8	46.4	21	69.8	34	93.2
9	48.2	22	71.6	35	95.0
10	50.0	23	73.4	36	96.8
11	51.8	24	75.2	37	98.6
12	53.6	25	77.0	38	100.4

Although temperature may be one of the easiest measurements to perform, it is probably one of the more important parameters to be considered. It dramatically affects the rates of chemical and biochemical reaction within the water. Many biological, physical, and chemical principles depend on the temperature. Some of the most common of these are the solubility of compounds in water, distribution and abundance of organisms living in the water, rates of chemical reactions, density inversions and mixing, and current movements.

Shallow bodies of water, such as small streams and storm drain ditches are much more susceptible to temperature changes because their capacity to store heat over time is also relatively small.

In a storm drain system, unusual temperature variations could indicate thermal pollution introduced by illegal discharges into the system.

Temperature Test Procedures:

Air temperature

Locate some place near your site to test the air temperature. Hang the thermometer on a pole or a tree out of direct sun and wind. Wait 2-3 minutes (no longer than 5) to allow thermometer to equilibrate. Record the value to the nearest 0.5 degrees C on your data form. Air temperature should always be taken at least three feet above the ground to avoid interference from ambient ground temperature. Never take air temperature over (or near) paved surfaces or next to buildings that could reflect heat.

Water temperature

- When you have collected the water sample in the bucket or beaker, remove the bucket from direct sunlight and wind. Do not hold the bucket or beaker in your hands because your hands might begin to warm the water. Put the thermometer in the bucket for 2-3 minutes and record the value to the nearest 0.5 degrees C. Read the thermometer while the bulb and lower part of the thermometer are under water.
- *Never take the thermometer out of the water to read the temperature!*
- Record your reading in the space provided on your data form.
- *Remember when reading air and water temperature – hold the thermometer on the end that is opposite the bulb!*

Cooling Method

With the thermometer in an upright position, cool the bulb only in a solution of shaved ice and salt so that the alcohol column retreats slowly into the bulb. Remove and swing the thermometer in a short arc forcing the entrapped gas to the top of the alcohol. Allow the bulb to warm slowly in the air.

Heating Method

Heat the thermometer bulb in a warm mixture or over a soft flame sufficient to allow the alcohol to rise slowly, until the separation and a portion of the main column enter the chamber. Tap the thermometer in the palm of your hand or on a padded surface to reunite the column. Allow the thermometer to cool slowly.

Ammonia-Nitrogen

Nitrogen is a fundamental plant nutrient and required by all living plants and animals for building protein. In aquatic ecosystems, nitrogen is present in different forms: nitrate, nitrite, ammonia, and organic nitrogen. All these forms of nitrogen are components of the nitrogen cycle.

Sources of ammonia-nitrogen to storm drain systems could be illegal connections to the sanitary sewer system, poorly functioning septic systems, fertilizer runoff, or wildlife (particularly large concentrations of ducks and geese).

Ammonia-nitrogen is toxic to freshwater aquatic organisms in a range that varies from 0.2 to 4.8 ppm depending on pH and temperature of the water. In unpolluted water, ammonia nitrogen is generally found at levels less than 1.0 ppm.

Ammonia-Nitrogen Testing Procedure:

1. Rinse test tube (0124)* twice with the water to be tested.
2. Fill test tube (0124) to 5 mL line with sample water.
3. Add one Ammonia #1 Tablet (3968) and one Ammonia #2 Tablet (3969). Cap and mix until tablets disintegrate. *Wait 5 minutes for color to develop fully.*
4. Facing a source of natural light, hold test tube flat against the white section of the Ammonia-Nitrogen Color Chart (6665-01). Match sample color to a color standard. If the value is between 2.0 and 4.0 ppm, estimate to 3.0 ppm. Otherwise, do not estimate your value choose the closest value. Record on your data form in the blank provided for ammonia-nitrogen.

WARNING: This test generates waste that is considered hazardous. This waste cannot be dumped into the sanitary sewer system but must be collected and disposed of properly.

*Note: Numbers in parentheses are references to proprietary products from LaMotte. It is not our intention to promote this vendor's products but to simply provide this as a reference for the convenience of the users of this manual.

pH

pH is a measure of how acidic or basic (alkaline) a solution is. In any given solution, some molecules of water break apart to form H^+ , hydrogen ions, and OH^- , hydroxyl ions. The pH scale ranges from 0 to 14 and is a means of showing which ion has the greater concentration. At a pH of 7.0, the concentration of both ions is equal and the water is said to be neutral, neither acidic nor alkaline. Pure water has a pH of 7.0. When the pH is less than 7.0, there are more hydrogen ions than hydroxyl ions and the water is said to be acidic. When the pH is greater than 7.0, there are more hydroxyl ions than hydrogen ions and the water is said to be basic or alkaline.

pH is defined as the negative logarithm of the hydrogen ion concentration. This means that on the pH scale, the concentration of hydrogen ions does not increase or decrease in a linear fashion. A pH of 3 is not just twice as acidic as a pH of 6. Increases are in powers of 10. At pH of 5, there are 10 times more H^+ ions than at a pH of 6. Therefore, a change in pH of one whole number is quite large.

Water's ability to resist changes in pH, or its buffering capacity, is critical to aquatic life. Generally, an aquatic organism's ability to complete a life cycle greatly diminishes as pH becomes greater than 9.0 or less than 5.0. There are several activities in water that can severely affect the pH, such as dissolved mineral substances, aerosols and dust that settle from the air, and dumping of man-made wastes.

Photosynthesis by aquatic plants also influences pH. It removes carbon dioxide from the water, which increases the alkalinity. In especially low-velocity or still waters with significant plant life (including planktonic algae), an increase in pH can be expected during the growing season or even during warm, sunny afternoons.

The carbon dioxide content of water in rivers and streams is less likely to change, but be aware of other events in the watershed that may affect pH. Human activities such as accidental spills, agricultural runoff (pesticides, fertilizers, animal wastes), and sewer overflows may also change pH.

SOME pH VALUES OF COMMON SUBSTANCES			
Battery acid	0.3	Seawater	8.0
Lemon juice	2.1	Egg whites	8.2
Vinegar	3.0	Baking soda	8.3
Orange juice	4.3	Ammonia	11.4
Pure rain	5.8	Bleach	12.7
Milk	6.9	Lye	13.6
Blood	7.5		

pH Test Methods

The pH testing methods that will be discussed in this manual are the use of pH strips and the pH meter.

pH Test Strips

The use of pH strips can be one of the quickest and most efficient ways of testing the pH of water. pH strips are a fast, accurate, and reproducible means to pH solutions. When a pH strip is dipped into a sample, the strip turns color corresponding to the pH, and the pH reading is then compared to a color key that is normally included with the pH strips container. Strips can be used in weakly colored and turbid solutions because they can be rinsed off. Strips can be immersed in a sample for extended periods, so weakly buffered solutions can be tested with accuracy.

There are different types of pH strips. The universal strip (wide range) tests the full 0–14 pH range with a sensitivity of 1 pH units. Intermediate range indicators provide a sensitivity of 0.3–0.5 pH units and narrow range strips provide a sensitivity of 0.2–0.3 pH units. Use distilled water for testing.

Store Strips Properly

Do not store your test strips outside. Keep them at room temperature, dry, and away from direct sunlight. Cap the container tightly right after removing a strip; do not wait until you are done testing.

Use Fresh Strips

Check the date on the bottle and replace expired strips. Beyond that date, you may get false readings resulting in wasted chemicals, or improper water balance.

Testing Procedure

Follow instructions on pH strips container.

The pH Meter

A pH meter is an electronic instrument used to measure the pH (acidity or basicity) of a liquid. A typical pH meter consists of a special measuring probe (a glass electrode) connected to an electronic meter that measures and displays the pH reading.

The pocket pH meter is available for use out in the field. It is a small, portable handheld device. This type of meter provides quick and accurate pH readings. Its measuring range is 0-14.0 pH with resolution to 0.1 pH and accuracy of +/-0.2 pH.

Conditioning the pH Meter

Crystals formed on the electrodes or dryness in the bottom of the black cap are signs that the pH probe needs to be conditioned.

1. If there is cotton in the bottom of the meter cap and the cotton is still moist and there are no crystals formed on the probe, proceed to calibration. If not, continue conditioning procedures.
2. Remove the cap of the pH meter and soak the sensor for at least one half hour in 7.0 pH buffer. Immerse the sensor end up to the ridge with the meter turned off. Insert a small piece of cotton moistened with the 7.0 pH buffer into the bottom of the cap. The piece of cotton should not contact the glass probe when the protective black cap is back in place. Check the pH meter the day before you plan to use it. If the black cap and cotton are dry, repeat the conditioning procedure.

Calibrating the pH Meter

These steps should be performed at least 24 hours before pH testing is performed. Because you are taking two readings within 24 hours, it is recommended you calibrate your pH meter immediately before your first test. This way, you will not have to calibrate twice. *If your second test time occurs more than 24 hours after initial calibration, you will have to recalibrate your meter.*

1. Remove the protective cap from your pH meter (pocket tester).
2. Rinse the beaker and meter twice with a small volume of 7.0 pH buffer solution.
3. Put enough buffer solution in the beaker to reach the immersion level of the meter when it is submerged in the solution. Dip the pen in the buffer up to the immersion level. Do not immerse the meter above the brown line.
4. Turn the meter on by pressing the ON/OFF button. Hold the meter one half inch off the bottom of the beaker and swirl gently. When the display stabilizes, check the meter reading. If the reading is 7.0, rinse the bulb with deionized water, shake off excess water, and proceed to step #8. If the reading is not 7.0, proceed to step #5.
5. Begin calibration by pressing the CAL button. The number displayed should begin flashing and will approach 7.0. It will rest on a number and stop changing. The number will continue flashing.
6. Calibrate the meter by pressing the HOLD button. The reading should immediately change to 7.0.
7. Turn the meter off.
8. Rinse the beaker and meter twice with a small volume of 10.0 pH buffer solution.
9. Put enough buffer solution in the beaker to reach the immersion level of the meter when it is submerged in the solution. Dip the pen in the buffer up to the immersion level. Do not immerse the meter above the brown line.

10. Turn the meter on by pressing the ON/OFF button. Hold the meter one half inch off the bottom of the beaker and swirl gently. When the display stabilizes, check the meter reading. The reading should be near 10.0. Do not readjust the meter.

Sampling For pH

1. Remove protective cap.
2. Rinse the beaker and meter twice with a small volume of sample water.
3. Put enough sample water in the beaker to reach the immersion level of the meter when it is submerged in the solution. Dip the pen in the buffer up to the immersion level. Do not immerse the meter above the brown line.
4. Turn the meter on by pressing the ON/OFF button. Hold the meter one half inch off the bottom of the beaker and swirl gently. When the display stabilizes, check the reading. Record this number as your pH in the appropriate space on your data form. **Turn the meter OFF.**

Simple Maintenance of the pH Meter

After each use, rinse your pH meter with distilled water or even tap water if deionized water is not available. When storing the pH meter, we recommend that you wet the sponge in the base of the cap with 7.0 pH calibration buffer solution or distilled water, and then replace the cap firmly. This retards leakage from the reference electrode and prolongs the useful life of the pH meter.

- ◆ Large differences in readings of pH (0.5 pH) could be due to dry electrode or run-down batteries. To improve performance, leave the pH meter up to immersion level in tap water for a few minutes at least once a week.
- ◆ To change batteries, open the cover at the top of the meter and replace batteries.

Chlorine

Chlorine is used as a disinfectant in water and wastewater treatment processes. It has the same effect on natural waters. Chlorine in natural waters is toxic to aquatic life, particularly micro-organisms and can create a "sterile" environment. Chlorine in storm drain discharge could indicate an illicit connection with the water supply system or someone's swimming pool.

Chlorine Test Procedure:

1. Rinse test tube (0101) twice with the water to be tested.
2. Fill test tube (0101) to the 10 mL line with the sample water.
3. Add one DPD #4R Tablet (6899), cap tube, and shake to dissolve tablet.
4. Immediately insert the test tube into the Octa-Slide Comparator. Match the color with a standard in the Chlorine Octa-Slide (3401). You must pick a value from the color bar. Do not estimate between numbers. If the color is lighter than the lightest color on the color bar, record your result as <0.2. Record results on your data form.

Copper

Copper is a metallic element essential to human growth and is found all over the world. It is used also to make coins, electrical components, bronze and brass products, agricultural poisons and algicides, medicines, and chemical reagents. Generally, detection of copper during monitoring could indicate an illicit discharge into the storm drain system. In fresh water, concentrations over 0.025 parts per million (ppm) are toxic to most freshwater fish species. The average concentration of copper in seawater is 0.003 ppm.

Copper Test Procedure:

1. Rinse two (0101) test tubes twice with the water to be tested.
2. Fill two test tubes (0101) to 10 mL mark with sample water.
3. Add 5 drops of Copper Reagent (6446) to one test tube. Cap and invert to mix
4. Insert the test tube with the added reagent into the Octa-Slide Comparator. Match the color with a standard in Copper Octa-Slide (3435). Choose a number on the color bar. Do not estimate between numbers. Record results on your data form.

WARNING: This test generates waste that is considered hazardous. This waste cannot be dumped into the sanitary sewer system but must be collected and disposed of properly.

Detergents

Detergents can be toxic to many aquatic plants, bugs, and fish. In addition to their possible chemical toxicity, detergents can lower the level of oxygen that is available to aquatic life, such as fish. This is a result of biodegradation of the detergent. Just because something is considered biodegradable does not mean it will not have a negative effect on aquatic life. Detergent enters our surface water through a variety of channels. Illicit discharges into storm drains account for some of the detergent detected in storm drain outfalls, from sources such as car washing, outdoor cleaning of screens and grills, and leaking sanitary sewers carrying detergents used in household cleaning.

Detergent Test Procedure:

1. Rinse test jar (0800) twice with the water to be tested.
2. Fill test jar (0800) to 65 ml line with water to be tested.
3. Using the 1.0 g Measuring Spoon (0697), add 2 grams of Detergent Reagent #1 (7444)(2 level measures). Shake vigorously to dissolve.
4. Using an unmarked pipet, fill the test jar (0800) to the 75 mL line with Detergent Reagent #2 (6037). This will take several pipetfuls.
5. Fill pipet (0335) to 0.5 mL line with Detergent Reagent #3 (7445) and add to the test jar (0800). Shake vigorously for 15 seconds and let stand until the layers separate (usually about 20-30 seconds).

If the top layer is light blue, less than 0.1 ppm detergent is present and no further testing is necessary. Record result as <0.1 ppm detergents.

If the top layer is colorless, proceed to step #6.

6. Continue adding Detergent Reagent #3 (7445) 0.5 mL at a time, shaking vigorously for 15 seconds after each addition and allowing the layers to separate until the top layer is light blue. Count the number of additions of 0.5 mL pipetfuls of Detergent Reagent #3 (7445) required to change the top layer in the jar from colorless to light blue.
7. Detergent concentrations in ppm = # of pipetfuls (0.5 mL) Detergent Reagent #3 (7445) needed in Step 4 x 0.1. Record results on your data form.

WARNING: This test generates waste that is considered hazardous. This waste cannot be dumped into the sanitary sewer system but must be collected and disposed of properly.

Phenols

Phenols are organic compounds that are byproducts of petroleum refining, tanning, and textile dye and resin manufacturing. They can also be found in animal wastes. Low concentrations cause taste and odor problems in water. It usually has a sweet and irritating odor. Higher concentrations can kill aquatic life and humans.

Phenols Testing Procedure:

1. Fill Sample Reaction Tube (0837) to line with sample water.
2. Use a 0.1g spoon (0699) to add 1 measure of Aminoantipyrine Reagent (7825). Cap and mix.
3. Use an unmarked pipet (0344) to add 4 drops of Ammonium Hydroxide Solution (7826). Cap and mix.
4. Use the 1.0mL pipet (0330) to add 2mL (2 measures) of Potassium Ferricyanide Solution (7827). Cap and mix. Solution will turn orange/pink if phenols are present.
5. Fill the test tube (0106) to 10mL line with the solution. Match sample color to color standard on the Phenols Octa-slide bar (3434). Record the results.

Color

Color is determined by visually comparing the sample to known color standards. The Borger Color System (BCS) was chosen as it uses 147 color chips representing colors that actually occur in aquatic insects.

Since protective coloration is part of some aquatic insects' natural defense mechanisms, this color chart will provide a range of natural colors found in creeks nationwide. Some aquatic insects also demonstrate bright colors in a range that would include those associated with illicit flows. The presence of dyes and process chemicals may be indicated when unusual colors are observed in storm drain systems.

Determining Water Color:

1. Rinse test tube (0101) twice with the water to be tested.
2. Fill test tube (0101) to the 10 mL line with sample water taken from the outfall (or as near as possible).
3. Under natural light, in the shade, hold the sample test tube next to the appropriate BCS chip and view down through the column of water. The color is compared to the BCS and assigned the appropriate number.
4. Once color is determined, record the appropriate BCS chip number as your color on your data form.

Do not try to assess water color by looking directly into the waterway as depth, substrate composition, aquatic plants, and sky conditions can all influence your perception of water color.

Turbidity

Turbidity is the measure of the relative clarity of water. Like color, turbidity is best observed in a clear sample bottle. Soil erosion, urban runoff, algal blooms and bottom sediment disturbances (caused by such things as boat traffic and abundant bottom feeding fish) are some of the causes of turbid water. At higher levels of turbidity, water loses its ability to support a diversity of aquatic organisms. Bodies of water become warmer as suspended particles absorb heat from sunlight, causing oxygen levels to fall. Photosynthesis decreases because less light penetrates the water, causing further drops in oxygen levels. The combination of warmer water, less light, and oxygen depletion makes it impossible for some forms of aquatic life to survive.

Turbidity Test Methods:

Using the Turbidity Comparator Test

1. Fill one (0107) test tube to the 10mL line with sample water.
2. Insert tube (with black lines to the rear) into Octa-Slide Viewer (1100). Insert Turbidity Standard Slide Bar (3436) into Octa-Slide Viewer. Compare the degree to which the black lines are obscured by the turbidity of the sample. Disregard any differences in color between the sample and the standards; test is based on turbidity, not color.
3. Identify the results as Low-Medium-High in the proper space on your data form.

The results may be expressed as a range of turbidity in FTUs (Formazin Turbidity Units).

Low
0-50 FTUs

Medium
75-150 FTUs

High
200-500 FTUs

Using the Turbidity Meter

A turbidity meter consists of a light source that illuminates a water sample and a photoelectric cell that measures the intensity of light scattered at a 90° angle by the particles in the sample. It measures turbidity in nephelometric turbidity units or NTUs. Meters can measure turbidity over a wide range from 0 to 1000 NTUs.

Turbidity Meter Procedures:

1. Prepare the turbidity meter for use according to the manufacturer's directions.
2. Use the turbidity standards provided with the meter to calibrate it. Make sure it is reading accurately in the range in which you will be working.
3. Shake the sample vigorously and wait until the bubbles have disappeared. You might want to tap the sides of the bottle gently to accelerate the process.
4. Use a lint-free cloth to wipe the outside of the tube into which the sample will be poured. Be sure not to handle the tube below the line where the light will pass when the tube is placed in the meter.
5. Pour the sample water into the tube. Wipe off any drops on the outside of the tube.

6. Set the meter for the appropriate turbidity range. Place the tube in the meter and read the turbidity measurement directly from the meter display.
7. Record the result on your data form.
8. Repeat steps 3-7 for each sample.

Oil Sheen

Hydrocarbons such as oil, gasoline, and grease often wash into the storm drain system through storm water runoff. Less often, leaking or abandoned underground petroleum storage tanks account for larger influxes of hydrocarbons. These substances are toxic to aquatic organisms.

Observation Instructions:

Observe outfall areas for the presence of an oil sheen (hydrocarbon residue) which can be identified by a rainbow-like sheen on the water's surface. In windy areas where the water's surface is extremely broken or in stretches of high flow rate, oil in the main stream may be hard to observe. In such situations, look closely in weedy areas at the shoreline or in small bank-side pockets for signs of oil. Polarized glasses or sunglasses help the observer when reflected glare off the water's surface is excessive.

If oil sheen is present in the outfall pool in any concentration, indicate this by checking the "yes" box on your data form.

There are some types of algae that will produce a surface sheen, especially in isolated, stagnated pockets or pools in soils next to the outfall pool. Also, certain types of iron-fixing bacteria often have the appearance of an oil sheen. They can be differentiated from hydrocarbon sheens by breaking the film. If the film stays broken, it is a natural bacterial film. If it flows back into place, it is hydrocarbon-based which indicates pollution. Do not record small pockets of stagnated water or bacterial sheen.

Odor

"Clean" natural drainage water (during most of the year) produces no distinctive odors other than a slight mustiness. Since most organic and many inorganic chemicals generate some odor, a simple sensory "smell" test can be a valid indicator of possible illicit flows in a waterway.

Determining Water Odor:

1. Rinse beaker twice with water to be tested.
2. Fill the beaker at least halfway with sample water and hold the sample about six inches from your nose. Use your free hand to fan the scent to your nose.
3. Record odor as a number using the chart below:

- 0 - No odor detected
- 1 - Gasoline
- 2 - Dry cleaning fluid
- 3 - Unidentified solvent odor
- 4 - Musty or septic
- 5 - Sweet or fruity
- 6 - Putrid (decay or decomposition odor)
- 7 - Chlorine
- 8 - Other (describe)

Never inhale the air directly off the top of the sample, as many potential contaminants are injurious to delicate nasal membranes and lung tissues.

When streamside sediments are disturbed, odors associated with anaerobic decomposition are often released. Therefore, disturb streamside sediments as little as possible.

Trash, Sewage, and Surface Scum

Sewage, surface scum, and trash are undesirable and the observer should try to identify these features at the outfall as best as possible. The color of scum and/or floating solids should also be noted. If identifiable, record additional information about your observations on the data form. This information may include color, amount, etc.

Record a "yes" or "no" response for the observation of each variable.

Additional Notes

Water in the outfall pool area will often reveal signs of storm drain contamination by sewage collection systems or toxic conditions. Look for these indicators and record the appropriate code on your data form in the space entitled *Notes*.

- 0** - None observed
- 1** - Fish kills
- 2** - Fecal matter
- 3** - Toilet paper (typically resembles flocculent material)
- 4** - Food products (such as corn)
- 5** - Condoms or plastic tampon applicators
- 6** - Tubifex worms (blood worms)
- 7** - Mosquito larvae concentrations ("wigglers")
- 8** - "Sewage fungus," actually observable, threadlike colonies of grayish white bacteria
- 9** - Absence of aquatic life (sterile)
- 10** - Other

Data Collection, Clean Up, and Storage

Data Collection and Management

It is important to record your data on a standardized form. The Regional Protocol uses a single page Data Form (Appendix A) for each testing event. At least one copy of all data collected by MS4 staff should be maintained in a single location by the MS4.

Always record the test results as you go along and **do not rely on your memory. Make sure all sections of the data form are completed.** If information is not collected for a certain variable, leave the appropriate space blank or note “not measured.”

The back of the data form can be used to make comments about unusual weather conditions, changes due to erosion, problems you had with sampling, pollutant traceback, etc.

Please refer to the copy of an adapted version of the Center for Watershed Protection Outfall Reconnaissance Inventory (ORI) Sheet (Appendix B). Use this sheet out in the field to keep track of physical indicators you observe that could possibly be signs of an illicit discharge.

Clean-Up and Storage of Equipment

Glassware Cleaning Procedure

It is important to wash test tubes with deionized water 3 times in succession after each test procedure is completed. Use Test Tube Brush (0514) as necessary.

At the end of each day, all sampling and test glassware should be washed with detergent and rinsed 3 times in succession.

To avoid possible detergent test interference, *do not use detergent to clean the Detergent Test Jar (0800)*; merely rinse 3 times in succession with deionized water. You can also rinse this jar first with hot tap water, then 3 times with deionized water.

Waste Disposal Procedure

Collect all waste from tests in one lidded container to be taken with you from the test site. Most waste from tests may be disposed of by flushing with lots of water down a toilet or drain, which is connected to a central treatment facility. Waste should never be discarded on the ground or back into water being sampled. However, be aware of the reagents that are used for each chemical test. Some of the waste that is generated may be considered hazardous. Always be familiar with the MSDS (Appendix B) that are included in the storm drain kits. They provide useful information on which substances are hazardous and where to go for disposal instructions.

Storage

Kits

Store testing kits in a clean, dry space away from pets and children. Do not subject the kits to extreme cold, heat, or humidity or leave them lying in the sun. It is best to store them in a closet in your home or workplace. Do not store them outside.

pH Meter

The pH meter is your most sensitive piece of equipment. It is very sensitive to excessive heat (like a closed car), excessive shaking, and excessive moisture (drizzle, being laid on a wet surface, or immersing the meter above the immersion line).

The pH pens are not waterproof or even water resistant. Be very careful to protect against moisture, especially during rainy conditions. Pens will not work properly if moisture gets into electronics.

DO NOT immerse in water above immersion ridge approximately one and a half inches from bottom of pen.

DO NOT let anything except your sample water or the pH buffer come in contact with the glass probe. It is very susceptible to being scratched.

DO place 1-inch of solution to be measured in the plastic beaker (supplied) to make your readings. This will protect against accidentally dropping the pen in water.

DO cover trimpot with a small piece of tape after calibration to protect the electronics against moisture.

DO wrap your pen in a towel or protective covering.

If pen gets damp, pull out batteries and allow electronics to dry. After electronics have dried, replace batteries.

Rinse the probe section of the pH pen in tap water. Store the pH pen wrapped in a towel or a protective covering.

Appendix A: Data Form

Dry Weather Field Screening Data Form

North Central Texas Regional Protocol



Outfall ID: _____ MAPSCO No. _____ Land Use: _____

GPS Unit #: _____ Resolution: _____

Lat/Long: _____ Current Weather: _____

Site Location: _____ Jurisdiction: _____

Outfall Dimension(s): _____ Sample Site: _____ (outfall, surface flow)

Receiving Water: _____ Flow Direction: _____

Calibration (within 24 hours of sampling)	Date	Time	Standard Value	Initial Meter Reading	Meter Adjusted to	Post Calibration

1st visit Date: _____ Time: _____

Precipitation <72 hours yes no

Flow: none low med high

pH _____ s.u.
 Conductivity _____ μ S
 Detergent _____ ppm
 Chlorine _____ ppm
 Copper _____ ppm
 Phenols _____ ppm
 Ammonia Nitrogen _____ ppm
 Air Temp _____ °C
 Water Temp _____ °C
 Color # _____
 Odor # _____
 Turbidity (meter) _____ NTUs

Comparator: Low (0-50) Med (75-150) High (200-500)

Sewage Yes No Trash Yes No

Oil Sheen Yes No Surface Scum Yes No

Notes:

2nd visit Date: _____ Time: _____

Precipitation <72 hours yes no

Flow: none low med high

pH _____ s.u.
 Conductivity _____ μ S
 Detergent _____ ppm
 Chlorine _____ ppm
 Copper _____ ppm
 Phenols _____ ppm
 Ammonia Nitrogen _____ ppm
 Air Temp _____ °C
 Water Temp _____ °C
 Color # _____
 Odor # _____
 Turbidity (meter) _____ NTUs

Comparator: Low (0-50) Med (75-150) High (200-500)

Sewage Yes No Trash Yes No

Oil Sheen Yes No Surface Scum Yes No

Notes:

Print Name

Date & Initials

**Appendix B:
Outfall Reconnaissance Inventory
(ORI) Field Sheet**

Outfall Reconnaissance Inventory (ORI) Field Sheet

North Central Texas Regional Protocol



Section 1: Background Data		
Date:	Time (Military):	
Jurisdiction:	Subwatershed:	Outfall ID:
Temperature (°C):	Rainfall (in.) Last 24 hrs:	Last 72 hrs:
GPS Unit: #:	Latitude:	Longitude:
Camera:	Photo #'s:	
Land Use in Drainage Area (circle all that apply): _____ Other: _____		
Industrial Residential Commercial Institutional Open Space Known Industries: _____		
Notes:		

Section 2: Outfall Description (Circle all that apply)				
LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
__ Closed Pipe	RCP-Reinforced Concrete CMP-Corrugated Metal PVC-Polyvinyl Chloride HDPE-High Density Polyethylene Steel Other: _____	Circular Elliptical Box Single Double Triple	Diameter/Dimensions: _____	In Water: No Partially Fully With Sediment: No Partially Fully
__ Open Drainage	Concrete Earthen Rip-Rap Other: _____	Trapezoid Parabolic Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
Flow Description (if present)	None Trickle Moderate Substantial			

Section 3: Quantitative Characterization for Flowing Outfalls				
PARAMETER		RESULT	UNIT	EQUIPMENT
__Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	Stop Watch
__Flow #2	Flow depth		In	Tape Measure
	Flow width		Ft. In	Tape Measure
	Measured length		Ft. In	Tape Measure
	Time of travel		S	Stop Watch
Temperature			°C	Thermometer
pH			pH units	Test Strip/Meter
Ammonia			Mg/L	Test Strip/Comparator

Section 4: Physical Indicators for Flowing Outfalls (Circle all that apply)					
INDICATOR	CHECK if present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor		Sewage Rancid/sour Sulfide Petroleum/gas Other: _____	1-Faint	2-Easily detected	3-Noticeable from a distance
Color		Clear Brown Gray Yellow Green Orange Red Other: _____	1-Faint colors in sample bottle	1-Clearly visible in sample bottle	3-Clearly visible in outfall flow
Turbidity		See Severity	1-Slight cloudiness	2-Cloudy	3-Opaque
Floatables; Trash not included		Sewage (Toilet Paper, etc.) Suds Petroleum (oil sheen) Other: _____	1-Few/slight; origin not obvious	2-Some; indications of origin (e.g., possible suds or oil sheen)	3-Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls (Circle all that apply)			
INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage		Cracking/Chipping Corrosion Peeling Paint	
Deposits/Stains		Oily Flow Line Paint Other: _____	
Abnormal Vegetation		Excessive Inhibited	
Poor Pool Quality		Odors Colors Floatables Oil Sheen Suds Excessive Algae Other: _____	
Pipe Benthic Growth		Brown Orange Green Other: _____	

Section 6: Overall Outfall Characterization (Circle)			
Unlikely	Potential (presence of two or more indicators)	Suspect (one or more indicators with a severity of 3)	Obvious

Comments

_____ Print Name

_____ Date & Initials

Appendix C: LaMotte Test Procedures



STORM DRAIN KIT

MODEL SSDK • CODE 7446

This portable field kit was specifically designed and manufactured to meet the U.S. EPA requirements specified in Federal Register, November 16, 1990 Vol. 55 No. 217. Read this and all other accessory instructions before use to familiarize yourself with the test procedures. Be sure to read all MSDS sheets and safety instructions prior to use.

***WARNING:** Reagents marked with an * are considered to be potential health hazards. To view or print a Material Safety Data Sheet (MSDS) for these reagents go to www.lamotte.com. To obtain a printed copy, contact LaMotte by e-mail, phone or fax. To order individual reagents or test kit components, use the specified code number.

MISCELLANEOUS ACCESSORIES

QTY.	CONTENTS	CODE
1	Beaker, plastic 250 mL,	0609
1	Graduated Cylinder, 10 mL, plastic	2-2296
1	Octra-Slide Viewer	1100
1	Test Tube Brush	0514

USE OF THE OCTA-SLIDE VIEWER

The Octra-Slide Viewer (1100) should be held so non-direct light enters through the back of the comparator. With sample tube inserted at top, slide the Octra-Slide bar through the viewer and match with color standards.

GLASSWARE CLEANING PROCEDURE

It is important to rinse test tubes with Deionized Water, three times in succession, after each test procedure is completed. At the end of each day, all sampling and test glassware should be brushed with the test tube brush (0514) and detergent and rinsed three times in succession with Deionized Water. This procedure can best be performed in your laboratory.

To avoid possible detergent test interference, do not use detergent to clean Detergent Bottle (0800), rinse three times in succession with Deionized Water only.

TOTAL RESIDUAL CHLORINE

METHOD - DPD
ACCURACY $\pm 10\%$

QTY.	CONTENTS	CODE
100	*Chlorine DPD #4R Tablet	*6899A-J
2	Test Tubes, plastic, w/caps	0106
1	Chlorine Octra-Slide Bar, 0.2-3.0 ppm	3401

PROCEDURE

1. Fill test tube (0106) to 5 mL line with water sample.
2. Add one *Chlorine DPD #4R Tablet (6899A). Cap and shake until dissolved.
3. Insert test tube into Octra-Slide Viewer (1100). Match color with a standard on the Chlorine Octra-Slide Bar (3401). Record as ppm Total Residual Chlorine.

PHENOLS

METHOD - AMINOANTIPYRINE
ACCURACY $\pm 10\%$

QTY.	CONTENTS	CODE
10 g	Aminoantipyrine Reagent	7825-D
60 mL	*Ammonium Hydroxide Solution	*7826-H
2 x 100 mL	*Potassium Ferricyanide Solution	*7827-J
1	Spoon, 0.1 g	0699
1	Pipet, plain, glass, w/cap	0344
1	Pipet Assembly, 1.0 mL, plastic, w/cap	0330
2	Test Tubes, plastic, w/caps	0106
1	Phenols Octra-Slide Bar, 0.5 ppm	3434
1	Sample Reaction Tube	0837

PROCEDURE

1. Fill Sample Reaction Tube (0837) to line with sample water.
2. Use 0.1 g spoon (0699) to add 1 measure of Aminoantipyrine Reagent (7825). Cap and mix.
3. Use the unmarked pipet (0344) to add 4 drops of *Ammonium Hydroxide Solution (7826). Cap and mix.
4. Use the 1.0 mL pipet (0330) to add 2 mL (2 measures) of *Potassium Ferricyanide Solution (7827). Cap and mix. Solution will turn orange/pink if phenols are present.
5. Fill test tube (0106) to 10 mL line with solution. Insert test tube into Octra-Slide Viewer (1100). Match sample color to a color standard on Phenols Octra-Slide Bar (3434). Record as ppm Phenols.

TOTAL COPPER

METHOD - DIETHYLDITHIOCARBAMATE
ACCURACY $\pm 10\%$

QTY.	CONTENTS	CODE
30 mL	*Copper 1	*6446-G
2	Test Tubes, plastic, w/caps	0106
1	Copper Octra-Slide Bar, 0-4.0 ppm	3435

PROCEDURE

1. Fill two test tubes (0106) to 10 mL line with sample water.
2. Add 5 drops of *Copper 1 (6446) to one test tube. Cap and invert to mix. If more yellow than second test tube, copper is present.
3. Insert each test tube into Octra-Slide Viewer (1100). Match color with a standard in Copper Octra-Slide Bar (3435).
4. Subtract the unreacted sample result from the reacted sample result. Record result as ppm Copper.

DETERGENTS

METHOD - SOLVENT EXTRACTION/
BROMOPHENOL BLUE INDICATOR
ACCURACY ± 0.1 ppm

QTY.	CONTENTS	CODE
60 g	*Detergent Reagent #1	*7444-H
3 x 100 mL	*Detergent Reagent #2	*6037-J
100 mL	*Detergent Reagent #3	*7445-J
1	Pipet, 0.5 mL, glass, w/cap	0335
1	Spoon, 1.0 g	0697
1	Bottle, French, Calibrated to 65 & 75 mL	0800

PROCEDURE

1. Fill Bottle (0800) to 65 mL line with sample water.
2. Use the 1.0 g spoon (0697) to add 2 measures of *Detergent Reagent #1 (7444). Shake until dissolved.
3. Fill to 75 mL line with Detergent Reagent #2 (6037).
4. Use pipet (0335) to add 0.5 mL Detergent Reagent #3 (7445). Shake vigorously for 15 seconds. Wait until layers separate (20-30 seconds). If the top layer is light blue, less than 0.1 ppm detergent is present and no further testing is necessary. If the top layer is colorless, continue adding Detergent Reagent #3 (7445), 0.5 mL at a time, shaking vigorously for 15 seconds after each addition, allowing the layers to separate until the top layer is light blue. Count the number of additions of 0.5 mL additions of Detergent Reagent #3 (7445) required to change the top layer in the bottle from colorless to light blue.
5. Detergent concentrations in ppm = (Number of pipets Detergent #3 (7445) - 1) x 0.1.
EXAMPLE: It takes 9 pipets to turn top layer light blue. $(9-1) \times 0.1 = 0.8$. The amount of detergent is greater than 0.7 ppm but less than 0.9 ppm detergent.

pH ELECTRONIC POCKETESTER

METHOD - ELECTROMETRIC
ACCURACY ± 0.2 pH UNITS

PROCEDURE:

See separate instruction sheet.

TURBIDITY

METHOD - VISUAL

QTY.	CONTENTS	CODE
2	Test Tubes, turbidity, w/caps	0106-WL
1	Turbidity Octra-Slide Bar, Low-Med-High	3436

PROCEDURE

1. Fill one (0106-WL) test tube to the 10 mL line with sample water.
 2. Insert tube (with black lines to the rear) into Octra-Slide Viewer (1100). Insert Turbidity Standard Slide Bar (3436) into Octra-Slide Viewer. Compare the degree to which the black lines are obscured by the turbidity of sample. Disregard any differences in color between the sample and the standards; test is based on turbidity, not color.
 3. Record results as Low-Medium-High.
- NOTE:** The standards were produced by comparing Formazin Turbidity standards and matching appropriate chips. The results may be expressed as a range of turbidity in FTU's.

LOW	MEDIUM	HIGH
0-50 FTU's	75-150 FTU's	200-500 FTU's

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AMMONIA-NITROGEN TEST KIT

CODE 5864

QUANTITY	CONTENTS	CODE
50	*Ammonia #1 Tablets	*3968A-H
50	*Ammonia #2 Tablets	*3969A-H
2	Test Tubes, plastic, w/cap	0106
1	Ammonia-Nitrogen Color Chart, 0.1 - 4.0 ppm	6665-01-CC

*WARNING: Reagents marked with an * are considered to be potential health hazards. To view or print a Material Safety Data Sheet (MSDS) for these reagents go to www.lamotte.com. To obtain a printed copy, contact LaMotte by e-mail, phone or fax.

To order individual reagents or test kit components, use the specified code number.

PROCEDURE

1. Fill test tube (0106) to 5 mL line with sample water.
2. Add one *Ammonia #1 Tablet (3968A) and one *Ammonia #2 Tablet (3969A). Cap and mix until tablets disintegrate. Wait 5 minutes.
3. Hold test tube flat against the white section of the Ammonia-Nitrogen Color Chart (6665-01-CC). Match sample color to a color standard. Record as ppm Ammonia-Nitrogen.

NOTE: Sample may be turbid. This will not affect the test results.

4. To convert result to Ammonia, multiply reading by 1.3. Record as ppm Ammonia.

WARNING! This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision

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Appendix D: Material Safety Data Sheets

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name POTASSIUM FERRICYANIDE SOLUTION

Other means of identification

Product Code(s) 7827

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory chemicals. Use as a laboratory reagent. Industrial (not for food or food contact use).

Details of the supplier of the safety data sheet

Manufacturer Address

LaMotte Company, Inc.
802 Washington Avenue
P.O. Box 329
Chestertown, MD 21620 USA
T 410-778-3100
F 410-778-9748

Emergency telephone number

24 Hour Emergency Number (CHEM-TEL):USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

EMERGENCY OVERVIEW

Appearance Clear yellow solution	Physical state liquid	Odor None
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Precautionary Statements - Prevention

Keep out of the reach of children.

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF SWALLOWED. Drink 1 or 2 glasses of water. Call a physician immediately.

Precautionary Statements - Storage

Store in a well-ventilated place. Keep cool.

3. COMPOSITION/INFORMATION ON INGREDIENTS

This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Chemical name	CAS No	Weight-%
Potassium ferricyanide	13746-66-2	2

4. FIRST AID MEASURES

First Aid Measures

Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and wash before reuse. Consult a physician if necessary.
Inhalation	Remove to fresh air.
Ingestion	Clean mouth with water and drink afterwards plenty of water.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible Products None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Potassium ferricyanide 13746-66-2	TWA: 1 mg/m ³	TWA: 5 mg/m ³	IDLH: 25 mg/m ³ TWA: 1 mg/m ³

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection	Wear safety glasses with side shields (or goggles).
Skin and body protection	Gloves & Lab Coat. Impervious clothing. Protective gloves. Nitrile rubber.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES**Information on basic physical and chemical properties**

Physical state	liquid	Odor	None
Appearance	Clear yellow solution		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
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pH	7	
Melting point / freezing point	No information available	
Boiling point / boiling range	ca 100 °C / 212 °F	
Flash point	No information available	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific gravity	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Extremes of temperature and direct sunlight.
Incompatible materials	None known based on information supplied.
Hazardous decomposition products	

11. TOXICOLOGICAL INFORMATION**Information on likely routes of exposure**

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Potassium ferricyanide 13746-66-2	Not Established	Not Established	Not Established

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Potassium ferricyanide 13746-66-2	Not Established	Not Established	Not Established	Not Established

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Potassium ferricyanide 13746-66-2	Not Established	Not Established	Not Established

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Potassium ferricyanide 13746-66-2	Not Established

13. DISPOSAL CONSIDERATIONS**Disposal Methods**

Dispose of waste product or used containers according to local regulations.

Contaminated packaging

Do not reuse empty containers.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Potassium ferricyanide 13746-66-2	Not Established	-	Not Established	Not Established

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Potassium ferricyanide 13746-66-2	Not Established	Not Established	Not Established	Not Established

Chemical name	California Hazardous Waste Status
Potassium ferricyanide 13746-66-2	-

14. TRANSPORT INFORMATION**DOT** Not regulated**IATA** Not regulated**IMDG/IMO** Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Potassium ferricyanide 13746-66-2	Not Established

SARA 311/312 Hazard Categories

Acute health hazard	No
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
Potassium ferricyanide 13746-66-2	Not Established	Not Established	Not Established	Not Established

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	RQ
Potassium ferricyanide 13746-66-2	-	Not Established	-

US State Regulations

California Proposition 65

Chemical name	California Proposition 65
Potassium ferricyanide 13746-66-2	Not Established

U.S. State Right-to-Know Regulations

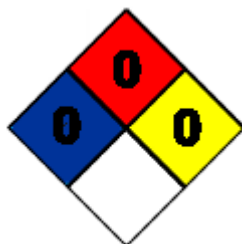
Chemical name	New Jersey	Massachusetts	Pennsylvania
Potassium ferricyanide 13746-66-2	X	Not Established	X

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances**16. OTHER INFORMATION****NFPA**

Health hazard 0

Flammability 0

Instability 0

Physical and Chemical
Hazards N/A**Issuing Date**

Jun-01-2015

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name AMMONIUM HYDROXIDE SOLUTION

Other means of identification

Product Code(s) 7826

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory chemicals. Use as a laboratory reagent. Industrial (not for food or food contact use).

Details of the supplier of the safety data sheet

Manufacturer Address
 LaMotte Company, Inc.
 802 Washington Avenue
 P.O. Box 329
 Chestertown, MD 21620 USA
 T 410-778-3100
 F 410-778-9748

Emergency telephone number

24 Hour Emergency Number (CHEM-TEL): USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 1

EMERGENCY OVERVIEW

DANGER

Hazard statements

Causes skin irritation. Causes serious eye damage.



Appearance Clear, colorless

Physical state liquid

Odor pungent Ammonia

Precautionary Statements - Prevention

Wash face, hands and any exposed skin thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

IF ON SKIN: Wash with plenty of soap and water.

If skin irritation occurs: Get medical advice/attention.

Take off contaminated clothing and wash before reuse
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 IF SWALLOWED, Drink 1 or 2 glasses of water, Call a physician immediately

Precautionary Statements - Storage

Store in a well-ventilated place. Keep cool.

Other Hazards

Very toxic to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula percent calculated based on w/w as Ammonia

Chemical name	CAS No	Weight-%
Ammonium hydroxide (28-30% Ammonia)	1336-21-6	<5
Water	7732-18-5	to 100

4. FIRST AID MEASURES

First Aid Measures

Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and wash before reuse. Consult a physician if necessary.
Inhalation	Remove to fresh air.
Ingestion	Clean mouth with water and drink afterwards plenty of water.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible Products None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	-	50ppm (NH3)	Not Established
Water 7732-18-5	-	-	Not Established

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection If splashes are likely to occur..

Skin and body protection Chemical resistant apron.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state liquid
Appearance Clear, colorless
Odor pungent Ammonia

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	13	No information available
Melting point / freezing point	No information available	
Boiling point / boiling range	< 100 °C / 212 °F	
Flash point	No information available	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	0.6 (Air=1)	
Specific gravity	No information available	
Water solubility	Soluble	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point No information available

Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Extremes of temperature and direct sunlight.
Incompatible materials	None known based on information supplied.
Hazardous decomposition products	

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	= 350 mg/kg (Rat)	Not Established	Not Established
Water 7732-18-5	> 90 mL/kg (Rat)	Not Established	Not Established

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	Not Established	Not Established	Not Established
Water 7732-18-5	Not Established	Not Established	Not Established	Not Established

ATEmix (oral)

8102

12. ECOLOGICAL INFORMATION

Ecotoxicity

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	8.2: 96 h Pimephales promelas mg/L LC50	0.66: 48 h Daphnia pulex mg/L EC50 0.66: 48 h water flea mg/L EC50
Water 7732-18-5	Not Established	Not Established	Not Established

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established
Water 7732-18-5	Not Established

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of waste product or used containers according to local regulations.

Contaminated packaging Do not reuse empty containers.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	-	Not Established	Not Established
Water 7732-18-5	Not Established	-	Not Established	Not Established

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	Not Established	Not Established	Not Established
Water 7732-18-5	Not Established	Not Established	Not Established	Not Established

Chemical name	California Hazardous Waste Status
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	-
Water 7732-18-5	-

14. TRANSPORT INFORMATION

DOT Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical

or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	1.0
Water 7732-18-5	Not Established

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	1000 lb	Not Established	Not Established	X
Water 7732-18-5	Not Established	Not Established	Not Established	Not Established

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	RQ
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	1000 lb	Not Established	RQ 1000 lb final RQ RQ 454 kg final RQ
Water 7732-18-5	-	Not Established	-

US State Regulations**California Proposition 65**

This product does not contain any Proposition 65 chemicals

Chemical name	California Proposition 65
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established
Water 7732-18-5	Not Established

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	X	X	X
Water 7732-18-5	Not Established	Not Established	X

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

Chemical name	CPSC (Consumer Product Safety Commission) - Specially Regulated Substances
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Add POISON to label, 16 CFR 1500.129 (>=5%, free or chemically uncombined)

16. OTHER INFORMATION

NFPA	Health hazard 2	Flammability 1	Instability 1	Physical and Chemical Hazards N/A
HMIS				



Issuing Date Jul-01-2015
Revision Date Jul-01-2015
Reason for revision New US GHS format

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name AMINOANTIPYRENE REAGENT

Other means of identification

Product Code(s) 7825

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory chemicals. Use as a laboratory reagent. Industrial (not for food or food contact use).

Details of the supplier of the safety data sheet

Manufacturer Address

LaMotte Company, Inc.
802 Washington Avenue
P.O. Box 329
Chestertown, MD 21620 USA
T 410-778-3100
F 410-778-9748

Emergency telephone number

24 Hour Emergency Number (CHEM-TEL): USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

OSHA Regulatory Status

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

EMERGENCY OVERVIEW

Appearance light yellow	Physical state powder	Odor None
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Precautionary Statements - Prevention

Keep out of the reach of children.

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF SWALLOWED. Drink 1 or 2 glasses of water. Call a physician immediately.

Precautionary Statements - Storage

Store in a well-ventilated place. Keep cool.

Other Hazards

May be harmful if swallowed

3. COMPOSITION/INFORMATION ON INGREDIENTS

4. FIRST AID MEASURES

First Aid Measures

Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and wash before reuse. Consult a physician if necessary.
Inhalation	Remove to fresh air.
Ingestion	Clean mouth with water and drink afterwards plenty of water.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Avoid breathing dust.

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment Sweep up in a manner that does not disperse dust and shovel into suitable containers for disposal.

Methods for cleaning up Dispose of contents/containers in accordance with local regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible Products Strong oxidizing agents. Strong acids. Acid chlorides.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Appropriate engineering controls

Engineering Measures Showers
 Eyewash stations
 Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Wear safety glasses with side shields (or goggles).
Skin and body protection Gloves & Lab Coat. Impervious clothing. Protective gloves. Nitrile rubber.
Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	powder	Odor	None
Appearance	light yellow		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	7	(0.1g/10mL water)
Melting point / freezing point	No information available	
Boiling point / boiling range	No information available	
Flash point	No information available	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific gravity	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Stability Stable under recommended storage conditions.
Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Exposure to air or moisture over prolonged periods.
Incompatible materials Strong oxidizing agents. Strong acids. Acid chlorides.
Hazardous decomposition products

11. TOXICOLOGICAL INFORMATIONInformation on likely routes of exposure**Component Information**Information on toxicological effects

ATEmix (oral)	2602
ATEmix (dermal)	12500 mg/kg

12. ECOLOGICAL INFORMATIONEcotoxicityPersistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

13. DISPOSAL CONSIDERATIONS

Disposal Methods Dispose of waste product or used containers according to local regulations.

Contaminated packaging Do not reuse empty containers.

14. TRANSPORT INFORMATION

DOT Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATIONInternational Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

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	No
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)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

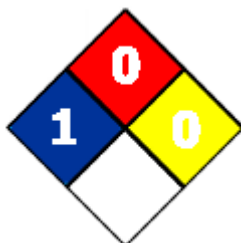
California Proposition 65

U.S. State Right-to-Know Regulations

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

16. OTHER INFORMATION

NFPA Health hazard 1 Flammability 0 Instability 0 Physical and Chemical Hazards N/A



Issuing Date

Jun-01-2015

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING**Product identifier****Product name** DPD #4R Tablet**Other means of identification****Product Code(s)** 6899A**Recommended use of the chemical and restrictions on use****Recommended Use** Use as a laboratory reagent. Industrial (not for food or food contact use). Laboratory chemicals.**Details of the supplier of the safety data sheet**LaMotte Company, Inc.
802 Washington Avenue
P.O. Box 329
Chestertown, MD 21620 USA
T 410-778-3100
F 410-778-9748**Emergency telephone number**

24 Hour Emergency Number (CHEM-TEL): USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW****Hazard statements**

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Appearance White**Physical state** solid Tablet**Odor** Odorless**Precautionary Statements - Prevention**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Keep out of the reach of children.

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF SWALLOWED. Drink 1 or 2 glasses of water. Call a physician immediately.

Precautionary Statements - Storage

Store locked up.

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant.

3. COMPOSITION/INFORMATION ON INGREDIENTS*

Chemical name	CAS No	Weight-%
Boric acid	10043-35-3	12

All ingredients may not be listed. Ingredients not listed do not meet the reporting requirements of the OSHA Hazard Communication Standard (HCS) as specified in 29 CFR 1910.1200.

Ingredients not specifically listed by name are proprietary to the LaMotte Company, registered under the State of New Jersey Trade Secret protection law, assigned the NJTSRN#80100291-5002p, and may be disclosed only in a medical emergency

4. FIRST AID MEASURES

First Aid Measures

General advice	Do not get in eyes, on skin, or on clothing.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and wash before reuse. Consult a physician if necessary.
Inhalation	Not expected to require first aid measures. Remove to fresh air.
Ingestion	Drink plenty of water. Never give anything by mouth to an unconscious person. Consult a physician if necessary.
<u>Self-protection of the first aider</u>	Use personal protection recommended in Section 8. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.
Notes to Physician	May cause sensitization of susceptible persons. Treat symptomatically.

5. FIREFIGHTING MEASURES

Suitable extinguishing media

Water spray, dry chemical, carbon dioxide (CO₂), or foam.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	Use personal protection recommended in Section 8. Avoid contact with skin, eyes or clothing.
Environmental precautions	See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment	Sweep up in a manner that does not disperse dust and shovel into suitable containers for disposal. Dispose according to local regulations, if permitted dissolve in water and rinse to drain.
Methods for cleaning up	After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling	Handle in accordance with good industrial hygiene and safety practice. Prevent contact with
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skin, eyes, and clothing. Do not taste or swallow. Do not eat, drink, or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Keep away from direct sunlight.

Incompatible Products None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Boric acid 10043-35-3	STEL: 6 mg/m ³ inhalable fraction TWA: 2 mg/m ³ inhalable fraction	-	Not Established

Appropriate engineering controls

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Wear safety glasses with side shields (or goggles). Avoid contact with eyes.

Skin and body protection Wear latex or nitrile gloves.

Respiratory protection None required under normal usage.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes, skin and clothing. Wear suitable gloves and eye/face protection. Wash hands and face before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	solid Tablet	Odor	Odorless
Appearance	White		
Color	White		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	6	(1 tablet in 10mL of water)
Melting point / freezing point	No information available	
Boiling point / boiling range	No information available	
Flash point	Not Applicable	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific gravity	No information available	
Water solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	

Explosive properties No information available
Oxidizing properties No information available

Other Information

Softening point No information available
Molecular weight No information available
VOC Content (%) No information available
Density No information available
Bulk density No information available

10. STABILITY AND REACTIVITY

Stability Stable.
Hazardous Reactions Hazardous polymerization does not occur.
Hazardous polymerization Hazardous polymerization does not occur.
Conditions to avoid Exposure to air or moisture over prolonged periods. Extremes of temperature and direct sunlight.
Incompatible materials None known based on information supplied.
Hazardous decomposition products Hazardous decomposition products formed under fire conditions -. Hydrogen iodide. Iodine.

11. TOXICOLOGICAL INFORMATION**Product Information****Information on likely routes of exposure****Component identification**

Chemical name	ATEmix (oral)	ATEmix (dermal)	Inhalation LC50
Boric acid 10043-35-3	= 2660 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 0.16 mg/L (Rat) 4 h

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Boric acid 10043-35-3	Not Established	Group 2A	Not Established	Not Established

ATEmix (oral) 7,167.00 mg/kg
ATEmix (dermal) 6,477.00 mg/kg

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Boric acid 10043-35-3	Not Established	1020: 72 h Carassius auratus mg/L LC50 flow-through	115 - 153: 48 h Daphnia magna mg/L EC50

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Boric acid 10043-35-3	-0.757

13. DISPOSAL CONSIDERATIONS

Disposal Methods Dispose of waste product or used containers according to local regulations.

Contaminated packaging Dispose of waste product or used containers according to local regulations.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Boric acid 10043-35-3	Not Established	-	Not Established	Not Established

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Boric acid 10043-35-3	Not Established	Not Established	Not Established	Not Established

Chemical name	California Hazardous Waste Status
Boric acid 10043-35-3	Toxic

14. TRANSPORT INFORMATION

DOT Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Does not comply
DSL/NDL	Does not comply
EINECS/ELINCS	Does not comply
ENCS	Does not comply
IECSC	Does not comply
KECL	Does not comply
PICCS	Does not comply
AICS	Does not comply

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Boric acid 10043-35-3	Not Established

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
Boric acid 10043-35-3	Not Established	Not Established	Not Established	Not Established

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	RQ
Boric acid 10043-35-3	-	Not Established	-

US State Regulations

California Proposition 65

Chemical name	California Proposition 65
Boric acid 10043-35-3	Not Established

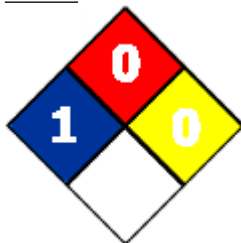
U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Boric acid 10043-35-3	X	Not Established	Not Established

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

16. OTHER INFORMATION

NFPA	Health hazard 1	Flammability 0	Instability 0	Physical and Chemical Hazards N/A
HMIS	Health hazard 1	Flammability 0	Stability 0	



Health Hazard	1
Fire Hazard	0
Reactivity	0

Prepared by Regulatory Affairs Department
 Issuing Date Jun-01-2015
 Revision Date Feb-24-2016

Revision note Boric acid classification differs between the US and EU. It is not classified in the US but it is in the EU.

Reason for revision

(M)SDS sections updated 2 3

Disclaimer

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End of Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name DETERGENT REAGENT 3

Other means of identification

Product Code(s) 7445
UN-No 1294

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory chemicals. Use as a laboratory reagent. Industrial (not for food or food contact use).

Details of the supplier of the safety data sheet

Manufacturer Address

LaMotte Company, Inc.
 802 Washington Avenue
 P.O. Box 329
 Chestertown, MD 21620 USA
 T 410-778-3100
 F 410-778-9748

Emergency telephone number

24 Hour Emergency Number (CHEM-TEL):USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

Skin corrosion/irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 2
Aspiration toxicity	Category 1
Physical hazards Flammable Liquids.	Category 2

EMERGENCY OVERVIEW

DANGER

Hazard statements

Causes skin irritation. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May cause damage to organs through prolonged or repeated exposure. May be fatal if swallowed and enters airways. .
 Highly flammable liquid and vapor.



Appearance No information available **Physical state** No information available **Odor** No information available

Precautionary Statements - Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal

protective equipment as required. Wash face, hands and any exposed skin thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep cool.

Precautionary Statements - Response

IF exposed or concerned: Get medical advice/attention.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If skin irritation occurs: Get medical advice/attention.

IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water

Wash contaminated clothing before reuse

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician, Do NOT induce vomiting

In case of fire: Use CO₂, dry chemical, or foam for extinction

Precautionary Statements - Storage

Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant.

Other Hazards

May be harmful if swallowed Toxic to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS No	Weight-%
Bromphenol blue	115-39-9	<0.1
Toluene	108-88-3	>90

4. FIRST AID MEASURES

First Aid Measures

General advice	Do not get in eyes, on skin, or on clothing. Do not breathe dust/fume/gas/mist/vapors/spray.
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Call a physician immediately.
Skin contact	Wash off immediately with plenty of water for at least 15 minutes. Remove and isolate contaminated clothing and shoes. Wash contaminated clothing before reuse. Call a physician immediately.
Inhalation	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, call a physician.
Ingestion	Drink plenty of water. Never give anything by mouth to an unconscious person. Do not induce vomiting without medical advice. Call a physician or poison control center immediately.
Self-protection of the first aider	Use personal protection recommended in Section 8. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Vapors may travel to source of ignition and flash back. Flash back possible over considerable distance.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures**Personal precautions**

Evacuate personnel to safe areas. Ensure adequate ventilation. Remove all sources of ignition. Use personal protection recommended in Section 8.

Environmental precautions

See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up**Methods for containment**

A vapor suppressing foam may be used to reduce vapors. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). Do not flush to sewer.

Methods for cleaning up

Minimize the amount spilled and suppress resultant vapors. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Precautions for safe handling**Handling**

Handle in accordance with good industrial hygiene and safety practice. Do not taste or swallow. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities**Storage**

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Store away from strong acids and oxidizers. Keep out of the reach of children.

Incompatible Products

Strong oxidizing agents. Nitric acid.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Bromphenol blue 115-39-9	-	-	Not Established
Toluene 108-88-3	TWA: 20 ppm	TWA: 200 ppm Ceiling: 300 ppm	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m ³ STEL: 150 ppm STEL: 560 mg/m ³

Appropriate engineering controls

Engineering Measures Showers
 Eyewash stations
 Ventilation systems. Use explosion-proof electrical/ventilating/lighting/equipment.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Wear safety glasses with side shields (or goggles).

Skin and body protection Chemical resistant apron.

Hygiene Measures Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state No information available
Appearance No information available **Odor** No information available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
	pH N/A	
Melting point / freezing point	No information available	No information available
Boiling point / boiling range	110 °C 231 °F	
Flash point	4 °C	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	7.1	
Lower flammability limit:	1.1	
Vapor pressure	3.8	kPa (25°C)
Vapor density	3.1	(air=1)
Specific gravity	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	480 °C	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point No information available
Molecular weight No information available
VOC Content (%) No information available
Density No information available
Bulk density No information available

10. STABILITY AND REACTIVITY

Stability Stable under recommended storage conditions.
Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Heat, flames and sparks.
Incompatible materials Strong oxidizing agents. Nitric acid.
Hazardous decomposition products Carbon oxides (COx).

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Bromphenol blue 115-39-9	Not Established	Not Established	Not Established
Toluene 108-88-3	= 2600 mg/kg (Rat)	= 12000 mg/kg (Rabbit)	= 12.5 mg/L (Rat) 4 h

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Bromphenol blue 115-39-9	Not Established	Not Established	Not Established	Not Established
Toluene 108-88-3	Not Established	Group 3	Not Established	Not Established

ATEmix (oral)	2889
ATEmix (dermal)	13333 mg/kg mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicity

Unknown Aquatic Toxicity 10 % of the mixture consists of component(s) of unknown hazards to the aquatic environment

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Bromphenol blue 115-39-9	Not Established	Not Established	Not Established
Toluene 108-88-3	12.5: 72 h Pseudokirchneriella subcapitata mg/L EC50 static 433: 96 h Pseudokirchneriella subcapitata mg/L EC50	11.0 - 15.0: 96 h Lepomis macrochirus mg/L LC50 static 14.1 - 17.16: 96 h Oncorhynchus mykiss mg/L LC50 static 15.22 - 19.05: 96 h Pimephales promelas mg/L LC50 flow-through 5.89 - 7.81: 96 h Oncorhynchus mykiss mg/L LC50 flow-through 50.87 - 70.34: 96 h Poecilia reticulata mg/L LC50 static 12.6: 96 h Pimephales promelas mg/L LC50 static 28.2: 96 h Poecilia reticulata mg/L LC50 semi-static 5.8: 96 h Oncorhynchus mykiss mg/L LC50 semi-static 54: 96 h Oryzias latipes mg/L LC50 static	5.46 - 9.83: 48 h Daphnia magna mg/L EC50 Static 11.5: 48 h Daphnia magna mg/L EC50

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Bromphenol blue 115-39-9	Not Established
Toluene 108-88-3	2.65

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Should not be released into the environment. Dispose of contents/containers in accordance with local regulations.

Contaminated packaging

Do not reuse empty containers.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Bromphenol blue 115-39-9	Not Established	-	Not Established	Not Established
Toluene 108-88-3	waste number U220	Included in waste streams: F005, F024, F025, F039, K015, K036, K037, K149, K151	Not Established	Not Established

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Bromphenol blue 115-39-9	Not Established	Not Established	Not Established	Not Established
Toluene 108-88-3	Not Established	Not Established	Toxic waste waste number F025 Waste description: Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	Not Established

Chemical name	California Hazardous Waste Status
Bromphenol blue 115-39-9	-
Toluene 108-88-3	-

14. TRANSPORT INFORMATION

DOT
 UN-No 1294
 Proper shipping name TOLUENE
 Hazard Class 3
 Packing group II

IATA
 UN-No 1294
 Proper shipping name TOLUENE
 Hazard Class 3
 Packing group II

IMDG/IMO
 UN-No 1294
 Proper shipping name TOLUENE
 Hazard Class 3
 Packing group II

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

US Federal Regulations**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Bromphenol blue 115-39-9	Not Established
Toluene 108-88-3	1.0

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	Yes
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Bromphenol blue 115-39-9	Not Established	Not Established	Not Established	Not Established
Toluene 108-88-3	1000 lb	X	X	X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	RQ
Bromphenol blue 115-39-9	-	Not Established	-
Toluene 108-88-3	1000 lb 1 lb	Not Established	RQ 1000 lb final RQ RQ 454 kg final RQ RQ 1 lb final RQ RQ 0.454 kg final RQ

US State Regulations**California Proposition 65**

WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm

Chemical name	California Proposition 65
Bromphenol blue 115-39-9	Not Established
Toluene 108-88-3	Developmental Female Reproductive

U.S. State Right-to-Know Regulations

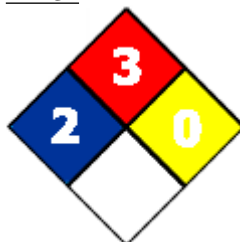
Chemical name	New Jersey	Massachusetts	Pennsylvania
Bromphenol blue 115-39-9	Not Established	Not Established	Not Established
Toluene 108-88-3	X	X	X

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

Chemical name	CPSC (Consumer Product Safety Commission) - Specially Regulated Substances
Toluene 108-88-3	Special labeling, 16 CFR 1500.14 (including mixtures containing >=10% by weight)

16. OTHER INFORMATION

NFPA	Health hazard 2	Flammability 3	Instability 0	Physical and Chemical Hazards N/A
HMIS	Health hazard 2	Flammability 3	Stability 0	



Issuing Date Jun-01-2015
Revision Date Jun-23-2015
Reason for revision New US GHS format

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name DETERGENT REAGENT 2

Other means of identification

Product Code(s) 6037
UN-No 1294

Recommended use of the chemical and restrictions on use

Recommended Use No information available.

Details of the supplier of the safety data sheet

Manufacturer Address
 LaMotte Company, Inc.
 802 Washington Avenue
 P.O. Box 329
 Chestertown, MD 21620 USA
 T 410-778-3100
 F 410-778-9748

Emergency telephone number

24 Hour Emergency Number (CHEM-TEL):USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

Skin corrosion/irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 2
Aspiration toxicity	Category 1
Physical hazards Flammable Liquids.	Category 2

EMERGENCY OVERVIEW

DANGER

Hazard statements

Causes skin irritation. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May cause damage to organs through prolonged or repeated exposure. May be fatal if swallowed and enters airways. .
 Highly flammable liquid and vapor.



Appearance No information available **Physical state** No information available **Odor** No information available

Precautionary Statements - Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal

protective equipment as required. Wash face, hands and any exposed skin thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep cool.

Precautionary Statements - Response

IF exposed or concerned: Get medical advice/attention.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF skin irritation occurs: Get medical advice/attention.

IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water

Wash contaminated clothing before reuse

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician, Do NOT induce vomiting

In case of fire: Use CO₂, dry chemical, or foam for extinction

Precautionary Statements - Storage

Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant.

Other Hazards

May be harmful if swallowed Toxic to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS No	Weight-%
Toluene	108-88-3	>90

4. FIRST AID MEASURES

First Aid Measures

General advice	Do not get in eyes, on skin, or on clothing. Do not breathe dust/fume/gas/mist/vapors/spray.
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Call a physician immediately.
Skin contact	Wash off immediately with plenty of water for at least 15 minutes. Remove and isolate contaminated clothing and shoes. Wash contaminated clothing before reuse. Call a physician immediately.
Inhalation	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, call a physician.
Ingestion	Drink plenty of water. Never give anything by mouth to an unconscious person. Do not induce vomiting without medical advice. Call a physician or poison control center immediately.
Self-protection of the first aider	Use personal protection recommended in Section 8. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Vapors may travel to source of ignition and flash back. Flash back possible over considerable distance.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Evacuate personnel to safe areas. Ensure adequate ventilation. Remove all sources of ignition. Use personal protection recommended in Section 8.

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment A vapor suppressing foam may be used to reduce vapors. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). Do not flush to sewer.

Methods for cleaning up Minimize the amount spilled and suppress resultant vapors. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice. Do not taste or swallow. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Store away from strong acids and oxidizers. Keep out of the reach of children.

Incompatible Products Strong oxidizing agents. Nitric acid.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Toluene 108-88-3	TWA: 20 ppm	TWA: 200 ppm Ceiling: 300 ppm	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m ³ STEL: 150 ppm STEL: 560 mg/m ³

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations

Ventilation systems. Use explosion-proof electrical/ventilating/lighting/equipment.

Individual protection measures, such as personal protective equipment

Eye/Face Protection	Wear safety glasses with side shields (or goggles).
Skin and body protection	Chemical resistant apron.
Hygiene Measures	Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	No information available	Odor	No information available
Appearance	No information available		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
		No information available
pH		
Melting point / freezing point	No information available	
Boiling point / boiling range	110 °C 231 °F	
Flash point	4 °C	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	7.1	
Lower flammability limit:	1.1	
Vapor pressure	3.8	
Vapor density	3.1	
Specific gravity	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	480 °C	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Heat, flames and sparks.
Incompatible materials	Strong oxidizing agents. Nitric acid.
Hazardous decomposition products	Carbon oxides (COx).

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure**Component Information**

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Toluene 108-88-3	= 2600 mg/kg (Rat)	= 12000 mg/kg (Rabbit)	= 12.5 mg/L (Rat) 4 h

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Toluene 108-88-3	Not Established	Group 3	Not Established	Not Established

ATEmix (oral)	2889
ATEmix (dermal)	13333 mg/kg mg/l

12. ECOLOGICAL INFORMATIONEcotoxicity

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Toluene 108-88-3	12.5: 72 h Pseudokirchneriella subcapitata mg/L EC50 static 433: 96 h Pseudokirchneriella subcapitata mg/L EC50	11.0 - 15.0: 96 h Lepomis macrochirus mg/L LC50 static 14.1 - 17.16: 96 h Oncorhynchus mykiss mg/L LC50 static 15.22 - 19.05: 96 h Pimephales promelas mg/L LC50 flow-through 5.89 - 7.81: 96 h Oncorhynchus mykiss mg/L LC50 flow-through 50.87 - 70.34: 96 h Poecilia reticulata mg/L LC50 static 12.6: 96 h Pimephales promelas mg/L LC50 static 28.2: 96 h Poecilia reticulata mg/L LC50 semi-static 5.8: 96 h Oncorhynchus mykiss mg/L LC50 semi-static 54: 96 h Oryzias latipes mg/L LC50 static	5.46 - 9.83: 48 h Daphnia magna mg/L EC50 Static 11.5: 48 h Daphnia magna mg/L EC50

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Toluene 108-88-3	2.65

13. DISPOSAL CONSIDERATIONS**Disposal Methods**

Should not be released into the environment. Dispose of contents/containers in accordance with local regulations.

Contaminated packaging

Do not reuse empty containers.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Toluene 108-88-3	waste number U220	Included in waste streams: F005, F024, F025, F039, K015, K036, K037, K149, K151	Not Established	Not Established

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Toluene 108-88-3	Not Established	Not Established	Toxic waste waste number F025	Not Established

			Waste description: Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	
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Chemical name	California Hazardous Waste Status
Toluene 108-88-3	-

14. TRANSPORT INFORMATION

DOT

UN-No 1294
 Proper shipping name TOLUENE
 Hazard Class 3
 Packing group II

IATA

UN-No 1294
 Proper shipping name TOLUENE
 Hazard Class 3
 Packing group II

IMDG/IMO

UN-No 1294
 Proper shipping name TOLUENE
 Hazard Class 3
 Packing group II

15. REGULATORY INFORMATION

International Inventories

TSCA Complies
 DSL/NDSL Complies
 EINECS/ELINCS Complies
 ENCS Complies
 IECS Complies
 KECL Complies
 PICCS Complies
 AICS Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
 DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
 EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
 ENCS - Japan Existing and New Chemical Substances
 IECS - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances
 PICCS - Philippines Inventory of Chemicals and Chemical Substances
 AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Toluene 108-88-3	1.0

SARA 311/312 Hazard Categories

Acute health hazard	No
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
Toluene 108-88-3	1000 lb	X	X	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	RQ
Toluene 108-88-3	1000 lb 1 lb	Not Established	RQ 1000 lb final RQ RQ 454 kg final RQ RQ 1 lb final RQ RQ 0.454 kg final RQ

US State Regulations

California Proposition 65

WARNING! This product contains Toluene, a chemical known to the State of California to cause birth defects or other reproductive harm.

Chemical name	California Proposition 65
Toluene 108-88-3	Developmental Female Reproductive

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Toluene 108-88-3	X	X	X

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

Chemical name	CPSC (Consumer Product Safety Commission) - Specially Regulated Substances
Toluene 108-88-3	Special labeling, 16 CFR 1500.14 (including mixtures containing >=10% by weight)

16. OTHER INFORMATION

<u>NFPA</u>	Health hazard 2	Flammability 3	Instability 0	Physical and Chemical Hazards N/A
<u>HMIS</u>	Health hazard 2	Flammability 3	Stability 0	



Issuing Date Jun-01-2015
Revision Date Aug-06-2015
Reason for revision New US GHS format

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING**Product identifier****Product name** DETERGENT REAGENT 1**Other means of identification****Product Code(s)** 7444**Recommended use of the chemical and restrictions on use****Recommended Use** Laboratory chemicals. Use as a laboratory reagent. Industrial (not for food or food contact use).**Details of the supplier of the safety data sheet****Manufacturer Address**LaMotte Company, Inc.
802 Washington Avenue
P.O. Box 329
Chestertown, MD 21620 USA
T 410-778-3100
F 410-778-9748**Emergency telephone number**

24 Hour Emergency Number (CHEM-TEL): USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION**OSHA Regulatory Status**

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

EMERGENCY OVERVIEW**Appearance** White powder **Physical state** solid powder **Odor** None**Precautionary Statements - Prevention**

Keep out of the reach of children.

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF SWALLOWED. Drink 1 or 2 glasses of water. Call a physician immediately.

Precautionary Statements - Storage

Store in a well-ventilated place. Keep cool.

Other Hazards

May be harmful if swallowed Harmful to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Chemical name	CAS No	Weight-%
Sodium Bicarbonate	144-55-8	33
Potassium chloride	7447-40-7	67

4. FIRST AID MEASURES

First Aid Measures

Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and wash before reuse. Consult a physician if necessary.
Inhalation	Remove to fresh air.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Consult a physician if necessary.

5. FIREFIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	Use personal protection recommended in Section 8. Avoid contact with eyes, skin and clothing.
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Methods and material for containment and cleaning up

Methods for containment	Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13).
Methods for cleaning up	After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling	Handle in accordance with good industrial hygiene and safety practice.
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Conditions for safe storage, including any incompatibilities

Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.
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Incompatible Products	None known based on information supplied.
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8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Control parameters**

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium Bicarbonate 144-55-8	-	-	Not Established
Potassium chloride 7447-40-7	-	-	Not Established

Appropriate engineering controls

Engineering Measures Showers
 Eyewash stations
 Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Wear safety glasses with side shields (or goggles).

Skin and body protection Gloves & Lab Coat. Impervious clothing. Protective gloves. Nitrile rubber.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES**Information on basic physical and chemical properties**

Physical state solid powder
Appearance White powder **Odor** None

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	8	(0.1g/10mL water)
Melting point / freezing point	No information available	
Boiling point / boiling range	No information available	
Flash point	Not Applicable	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific gravity	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point No information available
Molecular weight No information available
VOC Content (%) No information available
Density No information available
Bulk density No information available

10. STABILITY AND REACTIVITY

Stability	Stable under recommended storage conditions.
Hazardous polymerization	Hazardous polymerization does not occur.
Conditions to avoid	Extremes of temperature and direct sunlight.
Incompatible materials	None known based on information supplied.
Hazardous decomposition products	

11. TOXICOLOGICAL INFORMATION**Information on likely routes of exposure****Component identification**

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Sodium Bicarbonate 144-55-8	= 4220 mg/kg (Rat)	Not Established	Not Established
Potassium chloride 7447-40-7	= 2600 mg/kg (Rat)	Not Established	Not Established

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Sodium Bicarbonate 144-55-8	Not Established	Not Established	Not Established	Not Established
Potassium chloride 7447-40-7	Not Established	Not Established	Not Established	Not Established

ATEmix (oral)

2977

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Sodium Bicarbonate 144-55-8	650: 120 h Nitzschia linearis mg/L EC50	8250 - 9000: 96 h Lepomis macrochirus mg/L LC50 static	2350: 48 h Daphnia magna mg/L EC50
Potassium chloride 7447-40-7	2500: 72 h Desmodesmus subspicatus mg/L EC50	750 - 1020: 96 h Pimephales promelas mg/L LC50 static 1060: 96 h Lepomis macrochirus mg/L LC50 static	825: 48 h Daphnia magna mg/L EC50 83: 48 h Daphnia magna mg/L EC50 Static

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Sodium Bicarbonate 144-55-8	Not Established
Potassium chloride 7447-40-7	Not Established

13. DISPOSAL CONSIDERATIONS**Disposal Methods** Dispose of waste product or used containers according to local regulations.**Contaminated packaging** Do not reuse empty containers.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Sodium Bicarbonate 144-55-8	Not Established	-	Not Established	Not Established

Potassium chloride 7447-40-7	Not Established	-	Not Established	Not Established
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Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Sodium Bicarbonate 144-55-8	Not Established	Not Established	Not Established	Not Established
Potassium chloride 7447-40-7	Not Established	Not Established	Not Established	Not Established

Chemical name	California Hazardous Waste Status
Sodium Bicarbonate 144-55-8	-
Potassium chloride 7447-40-7	-

14. TRANSPORT INFORMATION

DOT Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
 DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
 EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
 ENCS - Japan Existing and New Chemical Substances
 IECSC - China Inventory of Existing Chemical Substances
 KECL - Korean Existing and Evaluated Chemical Substances
 PICCS - Philippines Inventory of Chemicals and Chemical Substances
 AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Sodium Bicarbonate 144-55-8	Not Established
Potassium chloride 7447-40-7	Not Established

SARA 311/312 Hazard Categories

Acute health hazard	No
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 Bicarbonate 144-55-8	Not Established	Not Established	Not Established	Not Established
Potassium chloride 7447-40-7	Not Established	Not Established	Not Established	Not Established

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	RQ
Sodium Bicarbonate 144-55-8	-	Not Established	-
Potassium chloride 7447-40-7	-	Not Established	-

US State Regulations**California Proposition 65**

Chemical name	California Proposition 65
Sodium Bicarbonate 144-55-8	Not Established
Potassium chloride 7447-40-7	Not Established

U.S. State Right-to-Know Regulations

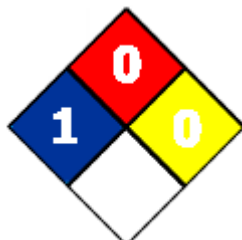
Chemical name	New Jersey	Massachusetts	Pennsylvania
Sodium Bicarbonate 144-55-8	Not Established	Not Established	Not Established
Potassium chloride 7447-40-7	Not Established	Not Established	Not Established

CPSC (Consumer Product Safety Commission) - Specially Regulated Substances**16. OTHER INFORMATION****NFPA**

Health hazard 1

Flammability 0

Instability 0

Physical and Chemical
Hazards N/A**Issuing Date**

Jan-29-2016

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated

and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name Copper 1

Other means of identification

Product Code(s) 6446

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory chemicals. Industrial (not for food or food contact use). Use as a laboratory reagent.

Details of the supplier of the safety data sheet

Manufacturer Address

LaMotte Company, Inc.
802 Washington Avenue
P.O. Box 329
Chestertown, MD 21620 USA
T 410-778-3100
F 410-778-9748

Emergency telephone number

24 Hour Emergency Number (CHEM-TEL):USA, Canada, Puerto Rico 1-800-255-3924 Outside North American Continent (Call collect) 813-248-0585

2. HAZARDS IDENTIFICATION

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

EMERGENCY OVERVIEW

WARNING

Hazard statements

Causes skin irritation. Causes serious eye irritation.



Appearance Clear, colorless

Physical state liquid

Odor pungent ammoniacal

Precautionary Statements - Prevention

Wash face, hands and any exposed skin thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Keep out of the reach of children.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

IF ON SKIN: Wash with plenty of soap and water If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 IF SWALLOWED Drink 1 or 2 glasses of water Call a physician immediately

Precautionary Statements - Storage

Store in a well-ventilated place. Keep cool.

Other Hazards

Harmful to aquatic life with long lasting effects

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS No	Weight-%
Toluene	108-88-3	<0.1
Diethylcarbamodithioic acid sodium salt trihydrate	20624-25-3	1
Ammonium hydroxide (28-30% Ammonia)	1336-21-6	<4
Water	7732-18-5	to 100%

4. FIRST AID MEASURES

First Aid Measures

Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek immediate medical attention/advice. Immediate medical attention is required.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Take off contaminated clothing and wash before reuse. Call a physician immediately.
Inhalation	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician immediately.
Ingestion	Do NOT induce vomiting. Rinse mouth. Call a physician or poison control center immediately.
Self-protection of the first aider	Use personal protection recommended in Section 8. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Water spray, dry chemical, carbon dioxide (CO₂), or foam.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions See section 8. Avoid contact with eyes, skin and clothing.

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13).

Methods for cleaning up Use personal protective equipment. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13). Following product recovery, flush area with water.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice. Prevent contact with skin, eyes, and clothing. Do not taste or swallow. Do not eat, drink, or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Separate from acids and alkalis. Keep out of the reach of children.

Incompatible Products Strong acids. Metals. Chlorine.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Toluene 108-88-3	TWA: 20 ppm	TWA: 200 ppm Ceiling: 300 ppm	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m ³ STEL: 150 ppm STEL: 560 mg/m ³
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	-	-	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	-	50ppm (NH ₃)	Not Established
Water 7732-18-5	-	-	Not Established

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Wear safety glasses with side shields (or goggles).

Skin and body protection Gloves & Lab Coat.

Respiratory protection Use only with adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state liquid
Appearance Clear, colorless
Odor pungent ammoniacal

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	12	
Melting point / freezing point	No information available	
Boiling point / boiling range	ca 100 °C No information available	
Flash point	No information available	
Evaporation rate		
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific gravity	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point No information available
Molecular weight No information available
VOC Content (%) No information available
Density No information available
Bulk density No information available

10. STABILITY AND REACTIVITY

Stability Stable under recommended storage conditions.
Hazardous polymerization Hazardous polymerization does not occur.
Conditions to avoid Excessive heat.
Incompatible materials Strong acids. Metals. Chlorine.
Hazardous decomposition products Ammonia. Nitrogen oxides (NOx). Contact with acid can release carbon disulfide.

11. TOXICOLOGICAL INFORMATION**Information on likely routes of exposure****Component Information**

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Toluene 108-88-3	= 2600 mg/kg (Rat)	= 12000 mg/kg (Rabbit)	= 12.5 mg/L (Rat) 4 h
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	= 1500 mg/kg (Rat)	> 1 g/kg (Rat)	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	= 350 mg/kg (Rat)	Not Established	Not Established
Water 7732-18-5	> 90 mL/kg (Rat)	Not Established	Not Established

Information on toxicological effects

Chemical name	ACGIH	IARC	NTP	OSHA
Toluene 108-88-3	Not Established	Group 3	Not Established	Not Established
Diethylcarbomodithioic acid sodium salt trihydrate 20624-25-3	Not Established	Group 3	Not Established	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	Not Established	Not Established	Not Established
Water 7732-18-5	Not Established	Not Established	Not Established	Not Established

ATEmix (oral)

20192

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Chemical name	Toxicity to Algae	Toxicity to Fish	Daphnia Magna (Water Flea)
Toluene 108-88-3	12.5: 72 h Pseudokirchneriella subcapitata mg/L EC50 static 433: 96 h Pseudokirchneriella subcapitata mg/L EC50	11.0 - 15.0: 96 h Lepomis macrochirus mg/L LC50 static 14.1 - 17.16: 96 h Oncorhynchus mykiss mg/L LC50 static 15.22 - 19.05: 96 h Pimephales promelas mg/L LC50 flow-through 5.89 - 7.81: 96 h Oncorhynchus mykiss mg/L LC50 flow-through 50.87 - 70.34: 96 h Poecilia reticulata mg/L LC50 static 12.6: 96 h Pimephales promelas mg/L LC50 static 28.2: 96 h Poecilia reticulata mg/L LC50 semi-static 5.8: 96 h Oncorhynchus mykiss mg/L LC50 semi-static 54: 96 h Oryzias latipes mg/L LC50 static	5.46 - 9.83: 48 h Daphnia magna mg/L EC50 Static 11.5: 48 h Daphnia magna mg/L EC50
Diethylcarbomodithioic acid sodium salt trihydrate 20624-25-3	Not Established	Not Established	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	8.2: 96 h Pimephales promelas mg/L LC50	0.66: 48 h Daphnia pulex mg/L EC50 0.66: 48 h water flea mg/L EC50
Water 7732-18-5	Not Established	Not Established	Not Established

Persistence and degradability

No information available.

Bioaccumulation/Accumulation

No information available.

Chemical name	Log Pow
Toluene 108-88-3	2.65
Diethylcarbomodithioic acid sodium salt trihydrate 20624-25-3	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established
Water 7732-18-5	Not Established

13. DISPOSAL CONSIDERATIONS**Disposal Methods**

Dispose of waste product or used containers according to local regulations.

Contaminated packaging

Do not reuse empty containers.

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Toluene 108-88-3	waste number U220	Included in waste streams: F005, F024, F025, F039, K015, K036, K037, K149, K151	Not Established	Not Established
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	Not Established	-	Not Established	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	-	Not Established	Not Established
Water 7732-18-5	Not Established	-	Not Established	Not Established

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Toluene 108-88-3	Not Established	Not Established	Toxic waste waste number F025 Waste description: Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	Not Established
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	Not Established	Not Established	Not Established	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established	Not Established	Not Established	Not Established
Water 7732-18-5	Not Established	Not Established	Not Established	Not Established

Chemical name	California Hazardous Waste Status
Toluene 108-88-3	-
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	-
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	-
Water 7732-18-5	-

14. TRANSPORT INFORMATION

DOT Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Does not comply
DSL/NDSL	Does not comply
EINECS/ELINCS	Does not comply
ENCS	Does not comply
IECSC	Complies
KECL	Does not comply
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	SARA 313 - Threshold Values %
Toluene 108-88-3	1.0
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	1.0
Water 7732-18-5	Not Established

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Toluene 108-88-3	1000 lb	X	X	X
Diethylcarbamodithioic acid sodium salt trihydrate 20624-25-3	Not Established	Not Established	Not Established	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	1000 lb	Not Established	Not Established	X
Water 7732-18-5	Not Established	Not Established	Not Established	Not Established

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	RQ
Toluene 108-88-3	1000 lb 1 lb	Not Established	RQ 1000 lb final RQ RQ 454 kg final RQ RQ 1 lb final RQ RQ 0.454 kg final RQ
Diethylcarbomodithioic acid sodium salt trihydrate 20624-25-3	-	Not Established	-
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	1000 lb	Not Established	RQ 1000 lb final RQ RQ 454 kg final RQ
Water 7732-18-5	-	Not Established	-

US State Regulations**California Proposition 65**

WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm

Chemical name	California Proposition 65
Toluene 108-88-3	Developmental Female Reproductive
Diethylcarbomodithioic acid sodium salt trihydrate 20624-25-3	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Not Established
Water 7732-18-5	Not Established

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Toluene 108-88-3	X	X	X
Diethylcarbomodithioic acid sodium salt trihydrate 20624-25-3	Not Established	Not Established	Not Established
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	X	X	X
Water 7732-18-5	Not Established	Not Established	X

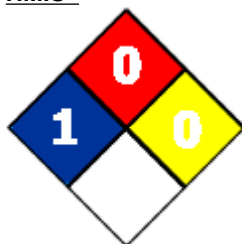
CPSC (Consumer Product Safety Commission) - Specially Regulated Substances

Chemical name	CPSC (Consumer Product Safety Commission) - Specially Regulated Substances
Toluene 108-88-3	Special labeling, 16 CFR 1500.14 (including mixtures containing $\geq 10\%$ by weight)
Ammonium hydroxide (28-30% Ammonia) 1336-21-6	Add POISON to label, 16 CFR 1500.129 ($\geq 5\%$, free or chemically uncombined)

16. OTHER INFORMATION

NFPA Health hazard 1 Flammability 0 Instability 0 Physical and Chemical Hazards N/A

HMIS Health hazard 1 Flammability 0 Stability 0



Health Hazard	1
Fire Hazard	0
Reactivity	0

Prepared by Regulatory Affairs Department
Issuing Date Jun-01-2015
Revision Date Sep-21-2015
Reason for revision (M)SDS sections updated 2 3

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Material Safety Data Sheet



MSDS

P.O. Box 329 - 802 Washington Avenue Chestertown, MD 21620 - USA

MATERIAL SAFETY DATA SHEET

TELEPHONE # FOR INFORMATION 410 778-3100

24 HOUR EMERGENCY NUMBER (CHEM-TEL): USA, Canada, Puerto Rico 800-255-3924;

Outside North American Continent 813-248-0585 (call Collect)

1. Product Identification

Product Code: 3969

Product Description: Ammonia #2 Tablets
New formula, 3969A

Manufactured By: LaMotte Company
802 Washington Avenue
Chestertown, MD 21620

2. Composition/Information On Ingredients

Hazard	CAS#/Name	%	PEL	TLV
Yes	1310-65-2 Lithium Hydroxide, anhydrous	10 - 15	N/E	N/E
Yes	554-13-2 Lithium Carbonate	0.1-0.4	N/E	N/E

All other ingredients are proprietary, NJTSRN 80100291-5033p

*Ingredients not listed by name are proprietary to LaMotte Co, registered under the state of New Jersey (U.S.A.) trade secret protection law, assigned the NJ Trade Secret Registry # 80100291-5033p and may be disclosed only in a medical emergency.

3. Hazards Overview

Primary Route Of Entry: Eye Skin Ingestion Inhalation

Warning! Corrosive. Irritating to eyes, skin, nose, throat, and respiratory system. Harmful if swallowed.

HMIS Hazard

Scale: 4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Least

Health: 2 Flammability: 0 Reactivity: 0

Carcinogenicity: None:

Other Health Related Comments:

Warning! This product contains lithium carbonate, a chemical known to the state of California to cause birth defects.

Product Code: 3969

Product Description: Ammonia #2 Tablets
New formula, 3969A

4. First Aid Measures

Eye Contact: Wash with water for 15 minutes. Consult physician.

Skin Contact: Wash with water for 15 minutes. Consult physician if skin irritation appears.

Ingestion: Do not induce vomiting. Drink plenty of water. Consult physician immediately.

Inhalation: Remove to fresh air.

5. Fire Fighting Measures

Flash Point (Method Used): N/A

LEL: N/A

UEL: N/A

Extinguishing Media: Not a fire hazard

Special Fire Fighting Procedures: Firefighters wear SCBA.

Unusual Fire & Explosion Hazard: Emits toxic fumes under fire conditions.

6. Accidental Release Measures

Small amt.: Dissolve in water. Neutralize carefully with 6M HCl. Flush down drain with water. Large amt. Wear gloves, eye protection & dust mask. Sweep up. Avoid crushing tablets: Dust causes eye, skin, throat irritation, sneezing & coughing.

7. Handling & Storage

Store tightly closed in cool, dry, place away from heat, moisture, and incompatible materials (strong acids, bases, or oxidizers). Keep out of reach of children.

Product Code: 3969

Product Description: Ammonia #2 Tablets
New formula, 3969A

8. Exposure Controls/Personal Protection

Ventilation

Normal

Protection When Handling

Eye Protection Gloves Lab Coat

Work/Hygenic Practices: Avoid handling tablets. Wash after handling.

9. Physical & Chemical Properties

Appearance:	White Tablet	Vapor Density:	N/A
Solubility In Water:	Soluble	Vapor Pressure:	N/A
Odor:	slight bleach	Boiling Point:	N/A
pH:	13(1 tablet in 5mL water)	Melting Point:	N/A

10. Stability & Reactivity

Stable:	Yes
Conditions To Avoid:	Heat, moisture
Incompatibility (Materials To Avoid):	Strong acids, strong oxidizers
Hazardous Decomposition Products:	Chlorine gas

11. Toxicological Information

Note:Lithium hypochlorite in old formula 3969 tablet has been replaced by an ingredient having a lower toxicity. The 3969A still contains traces of lithium carbonate. Li₂CO₃ has been found to cause birth defects in women undergoing lithium therapy.

Target Organs: Eyes Lung Skin

Product Code: 3969

Product Description: Ammonia #2 Tablets
New formula, 3969A

12. Ecological Information

Tablet contains ingredients which, in large quantity, are toxic to aquatic organisms. Lithium carbonate, present as a contaminant in lithium hydroxide, is toxic to fish and may be slightly toxic to birds.

13. Disposal Considerations

Containerize for disposal as haz. waste. Follow federal, state and local regs. If spilled material is contaminated w/ moisture, organic matter, or other chemicals, do not tightly seal container. Isolate it in a well ventilated place.

14. Transportation Information

Proper Shipping Name:

DOT: CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
(LITHIUM HYDROXIDE MIXTURE)

IATA: CORROSIVE SOLID, BASIC, INORGANIC, N.O.S.
(LITHIUM HYDROXIDE MIXTURE)

Hazard Class/Div:

DOT: 8

IATA: 8

UN: 3262

Packing Group: II

15. Regulatory Information

Chemical Inventory Status

Hazard	Ingredient	USA	Europe	--- Canada ---		Australia	Japan
		TSCA	EC	DSL	NDSL		
Yes	1310-65-2 Lithium Hydroxide, anhydrous	Yes	Yes	Yes	No	Yes	Yes
Yes	554-13-2 Lithium Carbonate	Yes	Yes	Yes	No	Yes	Yes

Federal, State, & International Regulations

Ingredient	--- SARA 302 ---		----- SARA 313 -----		CERCLA	RCRA 261.33	TSCA 8(D)
	RQ	TPQ	Listed	Chemical Category			
1310-65-2 Lithium Hydroxide, anhydrous	No	No	Yes	No	No	No	No
554-13-2 Lithium Carbonate	No	No	Yes	No	No	No	No

Product Code: 3969

Product Description: Ammonia #2 Tablets
New formula, 3969A

--- SARA 311/312 ---

Hazard Categories

----- Australia -----

**Hazchem
Code**

**Poison
Schedule**

**This MSDS Is
WHMIS Compliant**

Ingredient	Acute	Chronic	Fire	Pressure	Reactivity			
1310-65-2 Lithium Hydroxide, anhydrous	Yes	Yes	No	No	No	None Allocated	None Allocated	
554-13-2 Lithium Carbonate	Yes	Yes	No	No	No	None Allocated	None Allocated	
product 3969 as a whole	Yes	Yes	No	No	No	None Allocated	None Allocated	Yes

16. Other Information

Australia: This product is classified as a hazardous substance according to the criteria of ASCC (based on a risk assessment according to ASCC/NOHSC criteria.

Prepared By: IP, Regulatory Affairs Department

Revised: 11/29/2007

MATERIAL SAFETY DATA SHEET

LaMOTTE COMPANY

P.O. BOX 329 - CHESTERTOWN, MARYLAND 21620

TELEPHONE # FOR INFORMATION 410 778-3100

24 HOUR EMERGENCY NUMBER (CHEM-TEL) 800-255-3924

1. PRODUCT IDENTIFICATION

Product Code: 3968

Product Description: Ammonia #1 Tablets

2. HAZARDOUS INGREDIENTS

CAS#/Name	%	PEL	TLV
13755-38-9 Sodium Nitroferricyanide dihydrate	0.1 - 1	5 mg/cubic m as CN	5 mg/cubic m
54-21-7 Sodium Salicylate	<50	N/E	N/E

3. NON-HAZARDOUS INGREDIENTS

Name	CAS #	%
All other ingredients are proprietary, NJTSRN 80100291-5032p		

4. PHYSICAL DATA

Appearance:	White Tablet with red spots	Vapor Density:	N/A
Solubility In Water:	Soluble	Vapor Pressure:	N/A
Odor:	None	Boiling Point:	N/A
pH:	9(1 tablet in 5 mL water)	Melting Point:	Unknown

5. FIRE & EXPLOSION DATA

HMIS Hazard

Scale: 4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Least

Health: 1

Flammability: 0

Reactivity: 0

Flammable Limit

LEL: N/A

UEL: N/A

Extinguishing Media: Not a fire hazard

Flash Point (Method Used): N/A

Special Fire Fighting Procedures: N/A

Unusual Fire & Explosion Hazard: May produce poisonous cyanide fumes under fire conditions.

Product Code: 3968

Product Description: Ammonia #1 Tablets

6. REACTIVITY DATA

Stable: True

Conditions To Avoid: Moisture, heat. Temperatures above 190 deg C.

Incompatibility (Materials To Avoid): Strong acids, strong oxidizers

Hazardous Decomposition Products: NOx, HCN gas

7. HEALTH HAZARD DATA

Toxicity: orl rat LD50: orl rat LD50: 99 mg/kg for sodium nitroferricyanide; 930 mg/kg for sodium salicylate

Primary Route Of Entry: Ingestion

Carcinogenicity: None

Other Health Related Comments:

Target Organs:

Signs and Symptoms of Exposure: Harmful if swallowed, inhaled or absorbed through skin. May cause headache, vomiting, convulsions.

8. EMERGENCY FIRST AID PROCEDURES

Eye Contact: Flush with water for 15 minutes.

Ingestion: Induce vomiting. Drink plenty of water. Consult physician.

Inhalation: Remove to fresh air.

Skin Contact: Flush skin thoroughly with water. Wash with soap and water.

9. SPILL AND DISPOSAL PROCEDURES

Spill and Leak: Small quantity: Sweep up tablets. Dissolve in water and wash down drain with excess water. Large quantity: Sweep up. Place in a clean, dry, sealed container and send to hazardous waste incinerator.

Disposal: Dispose of as hazardous waste according to federal, state and local regulations.

10. PRECAUTIONARY MEASURES

In Handling: Gloves Eye Protection Other

Ventilation: Normal

Other: Lab Coat

Work/Hygienic Practices: Avoid handling tablets.

11. SPECIAL PRECAUTIONS

Date: 3/1/2004

Appendix E: Glossary of Terms

Ammonia-Nitrogen

Ammonia, naturally occurring in surface and wastewaters, is produced by the breakdown of compounds containing organic nitrogen.

Chlorine

Common disinfectant used in swimming pools, automated water systems, wastewater treatment effluent and potable water. *See Free Chlorine, Combined Chlorine, and Total Chlorine.*

Combined Chlorine

Residual chlorine existing in water in chemical combination with ammonia or organic nitrogen compounds which can be found in natural or polluted water.

Conductivity

Measure of the ability of the water to pass an electrical current and is affected by the presence of dissolved solids

Continuous Discharges

Discharges that occur most or all of the time, produce the greatest pollutant load, and are usually the easiest to detect.

Copper

Metallic element used to make coins, electrical components, bronze and brass products, agricultural poisons and algaecides, medicines, and chemical reagents.

Deposits or Stains

Any type of coating or discoloration that remains at an outfall as a result of dry weather discharges.

Direct Mode of Entry

Discharge coming from a direct connection to the storm drain pipe through a sewage pipe, shop drain, or other kind of pipe.

Discharge

The volume of water that passes a given point within a given period of time.

Dissolved Oxygen

The level of oxygen freely available in water; has been accepted as the single most important indicator of a water body's ability to support desirable aquatic life.

Dry Weather Discharge

The flow of a liquid from a storm water outfall during dry weather.

Effluent

Treated wastewater that flows out of a treatment plant or industrial outfall, prior to entering a water body.

Eutrophication

The accelerated growth of aquatic plant life in a body of water due to excessive dissolved nutrients.

False Negative

An indicator sample that identifies a discharge as uncontaminated when in fact it is actually contaminated.

False Positive

An indicator sample that identifies a discharge as contaminated when it is not.

Flow Chart Method

The use of four indicators (i.e. surfactants, ammonia, potassium, and fluoride) to identify illicit discharges.

Floatables

Floating materials (plastic, paper, wood, leaves, oil films, scum, slimes, etc.) that are either part of the inappropriate waste streams discharged to a storm water system or are collected by flows which enter a storm water drainage system.

Free Chlorine

Concentration of residual chlorine in water present as dissolved gas (Cl_2), hypochlorous acid (HOCl), and/or hypochlorite ion (OCl^-).

Illicit Connection

Any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.

Indicator Organism

An organism, species, or community that indicates the presence of a certain environmental condition(s)

Indicator Parameter

A water quality measurement that can be used to identify a specific discharge flow type, or discriminate between flow types.

Indirect Mode of Entry

Discharge is generated outside the storm drain system and entering through storm drain inlets or by infiltrating through the joints of the pipe.

Infiltration

The process of water or wastewater entering an underground storm drainage system through such means as defective pipes, pipe joints, connections, manhole walls, etc.

Inflow

The process of water entering a sanitary wastewater collection system from surface locations.

Intermittent Discharges

Discharges that occur over a shorter period of time; usually harder to detect since they are infrequent.

MS4

Municipal Separate Storm Sewer System. Refers to a conveyance or system of conveyances which includes roadways, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains.

Nutrient

Any substance used by living things to promote growth (i.e. nitrogen, phosphorus).

Outfall

The point at which a storm water drainage system discharges from a pipe, ditch, or other conveyance to a receiving water.

pH

Measure of how acidic or basic (alkaline) a solution is.

Phenols

Organic compounds that are byproducts of petroleum refining, tanning and textile, dye, and resin manufacturing. They can also be found in animal wastes.

Phosphorus

Essential nutrient to the growth of organism and can be the nutrient that limits the primary productivity of water. In excessive amounts (over 0.2 mg/L), it also contributes to the eutrophication of lakes and other water bodies.

Point Source

A single, identifiable location or source from which pollution may be discharged to surface waters.

Pollutant

Any material, substance, organism, or condition which can alter the physical, thermal, chemical or biological quality of water and render it harmful to humans, animal life, vegetation or property, or the public's health, safety, or welfare.

Potable Water

Water that has been treated or is naturally safe for drinking.

Raw Sewage

Untreated wastewater from all sources not permitted to discharge to an MS4.

Reagent

A chemical added to a sample to create a creation that enables the measurement of a target chemical parameter.

Receiving Water

A river, stream, lake, estuary, or other body of water, natural or man-made, into which storm water or treated wastewater may be discharged.

Sanitary Sewer

A series of underground pipes which carry sanitary waste or process wastewater to a treatment plant

Sewage

Sanitary wastewater or wastewater generated by commercial or industrial operations but does not include storm water.

Sewer

A pipe, conduit or drain, generally closed, but not normally flowing full, for carrying sanitary, industrial and commercial wastewater or storm water flows.

Storm drain

Enclosed pipe or open channel that is designed to carry storm water, surface runoff, street wash water, and other drainage from a specific area/source to receiving waters.

Surfactants

The main component of chemical detergents that detaches dirt from clothing or a surface. The actual concentration of surfactants is much lower than the concentration of detergents, but analytical methods that measure surfactants are often referred to as "detergents".

Total Chlorine

Sum of free chlorine and combined chlorine. When chlorinating most potable water supplies, total chlorine is essentially equal to free chlorine since the concentration of ammonia or organic nitrogen compounds (needed to form combined chlorine) will be very low. When chloramines are present in the municipal water supply, then total chlorine will be higher than free chlorine.

Tracer

A distinct component or combination of components of a polluting source which is identified in order to confirm the entry of a pollutant to a storm drainage system.

Transitory Discharges

Discharges that occur rarely, usually in response to a singular event such as an industrial spill, ruptured tank, sewer break, transport accident or illegal dumping episode.

Turbidity

Measure of the relative clarity of water.

Urbanized Area (UA)

An area of high population density that may include multiple MS4s as defined and used by the U.S. Census Bureau.

Appendix E: State and Federal Contacts

Organization	Department	Title	Name	Phone
TCEQ Region 4	Small Business/ Local Government Assistance	Environmental Compliance Assistance Specialist	Kristin Fenati	817-588-5827
TCEQ Region 4	Small Business/ Local Government Assistance	Environmental Compliance Assistance Specialist	Morgan Jansing	817-588-5868
TCEQ Region 4	Small Business/ Local Government Assistance	Environmental Compliance Assistance Specialist	Danielle Cochran	817-588-5927
TCEQ Hotline - Local Government Assistance	-	-	-	800-447-2827
TCEQ Hotline – Spill Reporting (24hr)	-	-	-	800-832-8224
EPA Region 6 HQ Dallas, TX	-	-	-	800-887-6063

Appendix G: Online Resources

Center for Watershed Protection

Homepage: www.cwp.org

- National Conference – Held online once per year
- *“Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and -Technical Assessments”*
Free Download: <http://www.cwp.org/online-watershed-library/>
- Webcast Series - 6 webcasts per year: <http://www.cwp.org/webcasts/>

Environmental Protection Agency

Homepage: www.epa.gov

- National Pollutant Discharge Elimination System (NPDES) <https://www.epa.gov/npdes>
- Stormwater Discharges from Municipal Sources
<https://www.epa.gov/npdes/stormwater-discharges-municipal-sources#developing>
- EPA Region 6 (South Central) <https://www.epa.gov/aboutepa/epa-region-6-south-central>

Texas Commission on Environmental Quality

Homepage: www.tceq.texas.gov

- Stormwater Permits for Municipal Separate Storm Sewer Systems (MS4s)
<https://www.tceq.texas.gov/permitting/stormwater/ms4>
- Training, Workshops, Seminars, Events <https://www.tceq.texas.gov/p2/events>
- Region Directory <https://www.tceq.texas.gov/about/directory/region/reglist.html>

