US Geological Survey

Western Ecological Research Center

San Francisco Bay Estuary Field Station

Invertebrate Lab Manual

SOPs, Safety, MSDS, Reference, Data Sheets

Updated 2010

Please note that the US Geological Survey, Western Ecological Research Center, San Francisco Bay Estuary Field Station Standard Operating Procedures (SOPs) are adapted from published methods, or developed by in-house technical and administrative experts. Their primary purpose is for internal use, although sampling and administrative SOPs may have wider utility. Our SOPs do not replace or supersede official published methods. Distribution of these SOPs does not constitute an endorsement of a particular procedure or method.

Any reference to specific equipment, manufacturer, or supplies is for descriptive purposes only and does not constitute an endorsement of a particular product or service.

Although the USGS Western Ecological Center follows the SOP in most instances, there may be instances in which they use an alternative methodology, procedure, or process.

These SOPs are not published and represent internal documentation and training for USGS staff.

For questions/comments please contact Isa Woo- iwoo@usgs.gov.

Please cite as:
US Geological Survey. 2010. Invertebrate lab manual. Unpublished benthic invertebrate sieving and sorting protocols. USGS, Western Ecological Research Center, San Francisco Bay Estuary Field Station, Vallejo, CA.

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Laboratory Safety Guidelines

Personal Protection

1. Use of gloves is required for handling certain chemicals (i.e. Rose Bengal). Black heavy duty gloves are available in 505 for handling dangerous chemicals.
2. Safety glasses must be worn **at all times** in the Lab. This is an OSHA requirement. The glasses must be of the impact protection type with splash guards. Other eye/face protection may be required with specific procedures. The glasses must be worn at all times within the lab space - even while working on the computer or writing in your lab book.
3. Contact lenses are discouraged. Contact lenses can be worn if and only if proper protective eyewear is also worn. Soft contact lenses are especially problematic because they can discolor and also absorb chemical vapors causing damage before the wearer is alerted to the problem.
4. Appropriate clothing is required. You must be covered to the knee and wear closed toe shoes. If you are wearing shorts or a tank top, then wear a lab coat.
5. Roll up sleeves and tie up loose clothing and long hair when working with equipment, open flame, any chemicals or biological substances.
6. Do not eat, drink (including sport bottles and water bottles), or store food in the labs.
7. Wash hands after working with chemicals.
8. Use window fans to ventilate lab room. Close doors and windows to greater office.

General Lab Rules

1. Keep sink clean and clear. Put all materials away on either project or community shelves after use.
2. Do not move balance. Calibrate before use and tare before weighing each sample. Clean all grime and fingerprints off glass and surfaces.
3. Keep scopes covered and clean when not in use.
4. Labels are required for all primary and secondary containers of hazardous materials. Primary containers are the original containers received from the manufacturer; secondary containers are squeeze bottles and other vessels to which hazardous materials are transferred by an employee.
    1. Secondary containers must be labeled with
        - name of the chemical and hazard warnings
        - date filled
        - initials of the person who filled the container
        - colored tape helps to distinguish similar looking bottles at a glance
    2. All boxes of samples must be labeled as to their project. Only samples currently being used should be stored temporarily on the project-specific shelves.
5. Lab tables should be as uncluttered as possible to allow work space and avoid accidents.

6. All chemical containers (1^o and 2^o) must be placed in secondary containers (tubs) while not in use. This is intended to contain the volume of chemical in the container in case of a spill.
7. Treat chemicals with respect and understand the chemicals you are using. Material Safety Data Sheets (MSDSs) are available in the binders in the bookshelf to the left of the Wetland Restoration office. Do not remove the MSDSs from the binders.
8. Fire extinguisher and eyewash station are located on the wall next to the door. Shower is available in the men's bathroom.
9. Notify a supervisor immediately in case of an accident, no matter how small it seems.
10. If you use the last of something, replace it or request it to be ordered.
11. Leave the lab area clean. Put equipment and chemicals away and wipe off the bench top.
12. Make sure to remove fans, lock windows, and close blinds and door when you are finished working in the lab.

Disposal of Wastes

1. Do not dispose of chemicals in the sink. (Rule of Thumb: If you don't want to drink it, don't dump it in the sink). Follow MSDS instructions for disposal. Be sure to dispose of chemicals in the proper waste collector. Do not mix halogenated chemical waste with non-halogenated chemical waste**.**

2. Any container that is used to collect chemical waste must be properly labeled and closed at all times unless actively pouring into it. All chemical waste containers must be in a secondary container until taken to waste disposal (not left in 505!). If you have any questions, ask your supervisor before disposing of material down sink.

3. Properly dispose of animal tissue in the red or orange Biohazard bags. Never throw animal tissue in lab garbage cans. Your supervisor should provide necessary detail.

4. Dispose of broken glass and "sharps" (scalpels, needles, razorblades, etc.) in a labeled sharps box and dispose of properly.

Who to Contact

If someone is injured or poisoned, call 911 immediately!

Poison Control Center: (800) 876-4766

Vallejo Fire Dept (non-emergency): (707) 648-4526

Invertebrate Sieving SOP

Materials for Sieving

- Invertebrate datasheets
- Number 35 (0.5 mm) sieve
- Pencils, black thick sharpie
- Labels
- 16 oz. Nalgene squirt bottles
- 8 or 12 oz polystyrene jars, lids
- Dissecting forceps, spatula
- Bottomless bucket (of same diameter as sieve)
- Cooler (to keeps cores cold)
- 70% Ethyl alcohol with Rose Bengal dye (Be careful-read MSDS)
- Hose

Methods

Sieving samples:

Samples should be immediately stored in the refrigerator and sieved no later than one week following collection. For samples containing dense clumps of silt or clay, fill sample bag with water and let soak for a few hours prior to sieving.

1. Gather your materials and set up a sieving station at a hose or utility sink. Place the 0.5 mm sieve on top of a bottomless bucket to create a sieving base. If sieving many samples, keep core samples in a cooler or fridge until sieving.

2. Pick a sample to process and examine the contents. Make sure any samples needed for sediment analysis are removed before sieving. Start a new datasheet for each sample location and record the following:

   <u>At top of data sheet:</u>
   Project name, location within project, number of cores, name of collectors and date of collection.

   <u>For each sample:</u>
   Sample ID, initials of siever, and date of sieving

Project Name:				Location:			Type: Benthic
Number of Cores:				Collected by:			Collection date:
Sample		Sieving		Sorting			
Core	Rep	Sieved on	By	Sorted on	By	# of Vials	Notes

3. Place the samples in a bucket of clean water. The largest, heaviest sediments will settle to the bottom. Pour the water with suspended invertebrates gently over the sieve.

4. Scan the sieve and pick any invertebrates from the sieve and place into a labeled 40 mL vial containing 70% ethanol for preservation.

5. Repeat this process until the core is completely broken up and rinsed into the sieve. Place the remaining sample matrix into labeled jars, making sure jar is labeled on both the side and lid, and a rite-in-the-rain label is placed inside the jar. All labels should contain the Project Name, Sample ID (or Core-Rep), Collection Date, Siever initials and date sieved.

Project Name
Sample ID
Collection Date
Siever initials & Date

6. Add solution of ethanol and rose Bengal dye solution until the sample is completely submerged.

* Note: Samples with a large amount of organic matter require a higher concentration of ethanol (95%) for adequate preservation.

How to Make Rose Bengal 70% Ethanol Solution

$C_i * V_i = C_f * V_f$
$0.95 * V_i = 0.70 * 4{,}000$ Ml
$V_i = 2947$ mL of 95% EtOH


Beaker

4000 mL (V_f) – 2947 mL (95% EtOH) = 1,053 mL of DI H_2O

So, add:
2,947 mL of 95% Ethanol
1,053 mL of distilled water
Small spatula of Rose Bengal

Invertebrate Sorting SOP

Materials for Sorting

- Invertebrate datasheets
- Pencils, black thin sharpie
- Tape for Labeling
- Dissecting microscope
- Illuminated magnifier
- 100 x 15-mm plastic Petri dishes
- 16 oz. Nalgene squirt bottles
- Dissecting forceps, probe
- 70% Ethyl alcohol with Rose Bengal dye
- Vials (40 mL scintillation vials or equivalent)

Methods

Sorting samples:

1. Pick a sample that hasn't been sorted. In Vallejo, these samples are on the shelf next to the sink. Check to make sure priority samples are sorted first.

2. Sort organisms into broad taxonomic groups. Put a spoonful of sample onto a petri dish, place under the illuminated magnifier/microscope and sort through the material with forceps. You can also divide samples among Petri dishes and sort systematically, one at a time. Organisms from each sample should be sorted into categories and stored in small temporary vials marked with the sample ID, initials, and date. Keep covered with alcohol. If in doubt, put it in the "Unknown" category.
    - Categories for sorting organisms:

Nematoda	Amphipoda
Bivalvia (clams, mussels)	Cumacea
Gastropoda (snails, slugs)	Isopoda
Polychaeta	Ostracoda
Oligochaeta	Unknown/Other

    Do Collect:
    - Rose Bengal-dyed invertebrates
    - Certain invertebrates, such as immature insects, may not pick up the dye very well, but should still be collected
    - Non-aquatic invertebrates in the sample (e.g. ants, flies) UNLESS you directly witness them fly/crawl in during the sieving/sorting process. They may have been collected during the core collection and provide interesting information about our sampling locations.
    - Meiofaunal invertebrates such as nematodes, ostracods, etc... Even if some of the specimens may be washed away during the sieving process due to size,

it is still very interesting to include these invertebrates as part of the benthic community assemblages.

- Invertebrate pieces (heads, headless invertebrates, appendages, unidentifiable tissue)

Do NOT Collect:

- Empty or sediment-filled shells of clams, mussels, and snails. Generally, samples without invertebrate tissue will not pick-up the rose Bengal dye very well. If you are unsure, collect and place in "Unknown" vial.

Use Lights Manual, USGS invertebrate identification manual, reference collection vials, etc. to aide in sorting if necessary.

3. Save material that you sort invertebrates from in its original jar. Label this "processed" along with the sample identifier and date, and place brightly colored tape around the base. Make sure to cover material in ethanol/rose Bengal solution for preservation. Place sample on the 'processed' shelf with the other processed samples until they have completed QA/QC procedures and are ready to be archived.

4. If you step away from a partially sorted sample for more than a few minutes (i.e. lunch, breaks), make sure to add 70% ethanol to Petri dish and cover because desiccation will harm specimens. If the sample is not complete at the end of the day, put any unsorted material back into a new labeled jar and cover with ¾ water and ¼ alcohol.

❖ Make sure to clean all utensils and sieve thoroughly between samples. Leave sink free of any silt or debris and use lots of extra water to flush any alcohol waste down drain. Make sure to follow all posted laboratory rules to keep lab clean and organized.

Invertebrate Identification SOP

Invertebrate identification will be made by senior invertebrate specialists, taxonomists, or lead invertebrate technician.

- Identification and enumeration of sorted organisms will be performed to the lowest taxonomic level possible, to species, if possible.
- The identifications will be done by in-house taxonomists and contract taxonomists, using minimum dissecting light microscopes and compound light microscopes. Identifications will be recorded on prepared data sheets. A minimum of two pieces of literature should be used for each species identification, one of which should be the original description.
- Identifications will be checked against reference specimens (when available). Nisqually samples sent to Aquatic Biology Associates will be required to provide a verified voucher collection of the organisms found. The collection will consist of one to five specimens of each taxon found in the survey region. Each vial will contain specimens from a single station.
- A computer listing of each species name, the identifying taxonomist and the verifying taxonomist will be kept electronically at SFBE. This list will also contain taxonomic classification of the organisms, foraging guild, location of the specimen in the voucher collection (if present), and references to pertinent literature.

External Laboratories Resources

- USGS Water Resources, National Research Program.
  - Francis Parchaso
    345 Middlefield Road, MS-435
    Menlo Park, CA 94025
    650-329-4586
    parchaso@usgs.gov

External Laboratories for Identification QA/QC

- Aquamarine Environmental Services
  - Kathy Welch, Director
    1010 Brookmere Drive
    Edmonds, WA 98020
    425-776-3074
    kwelch3479@aol.com

- Aquatic Biology Associates (www.aquaticbio.com)
  Bob Wisseman, Senior Scientist.
  3490 NW Deer Run Street
  Corvallis, OR 97330.
  541-752-1568
  bobwisseman@mac.com

Invertebrate QA/QC Procedures

Invertebrate Sorting QA/QC

- A minimum of 10% of the samples sorted by each laboratory technician will be resorted by a separate technician with greater or at least equivalent experience. One sample will be randomly selected from a batch of ten consecutively sorted samples per technician. The sample ID, sample date, sorting technician initials, sorting date, QC technician intials, QC date, QC results, and actions taken will be recorded in a QC log.

- Maximum error percentages should be less than 10%, except in cases of samples yielding very low numbers of individuals. These samples with a skewed picking error percentage will be taken into consideration when determining if a sample fails the Quality Control Check. The main criteria in this determination will be deciding whether the error affects the ecological interpretation of the data.

- Sorting efficiency will be calculated using the following formula:

$$SE = \frac{\text{\# invertebrates originally picked from sample}}{\text{\# invertebrates originally picked + \# invertebrates picked in QC}} \times 100$$

Invertebrate Identification QA/QC

- New invertebrate technicians, specialists, and taxonomists are required to receive training in the areas of terminology, anatomy, morphology, and taxonomy of benthic invertebrates for each locality specimens are taken from. This can be accomplished in one of two ways: instruction from a senior benthic analyst in the laboratory, or by attending an external course taught by benthic specialists. An example of an acceptable training course would be taught by the North American Benthological Society.
- Quality control for senior taxonomists will be provided by the verification of voucher collections.
- At least 10% of all identified taxonomic groups will be sent to external laboratories for verification.
- If the samples are in agreement, the identification is accepted and recorded as verified.
- If the sample identification is not in agreement, we will compare notes on identifying features for the specimen and send the specimen to a third party invertebrate taxonomist, such as the California Academy of Sciences.

References

Aasen, S. 2008. Standard operating procedures for macrobenthic sample analysis. Washington State Department of Ecology, Environmental Assessment Program. Quality Assurance Report.

GoalsProject. 2000. Baylands ecosystem species and community profiles: life histories and environmental requirements of key plants, fish and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project (P. Olofson, ed.). San Francisco Bay Regional Water Quality Control Board, Oakland, California.

Haase, P., Murray-Bligh, J., Lohse, S., Pauls, S., Sundermann, A., Gunn, R., Clarke, R. 2006. Assessing the impact of errors in sorting and identifying macroinvertebrate samples. Hydrobiologia 566: 505-521

Moulton II, SR., JL Carter, SA Grotheer, TF Cuffney, and TM Short. 2000. Methods of analysis by the US Geological Survey National water quality laboratory—processing, taxonomy, and quality control of benthic macroinvertebrate samples. US Geological Survey Open File Report 00-212.

US Geological Survey, Western Ecological Research Center, San Francisco Bay Estuary Field Station. 2010. Invertebrate guide. Unpublished taxonomic guide to benthic invertebrates.

Markmann, C, 1986. Benthic Monitoring in the Sacramento-San Joaquin Delta. Results from 1975 through 1981. Interagency Ecological Program for the Sacramento-San Joaquin Estuary. Technical Report 12. California Department of Water Resources, Sacramento California.

Thompson, B., S. Lowe, and M. Kellogg. 2000. Macrobenthic Assemblages of the San Francisco Bay-Delta, and their Responses to Abiotic Factors. Regional Monitoring Program for Trace Substances, Technical Report 39, San Francisco Estuary Institute, Richmond, CA.

Sample Data Tracking Sheet

Location:

Sample Type: _____

Number of Samples for Month: _____ Collectors: Sample Month:

Sample			Date Collected	Date Received	Sieving		Sorting		Identification		
Site	Type	Rep	Field	Vallejo	Date Sieved	By	Date Sorted	By	Date ID	By	Notes

Labeling Checklist

Sieving:

- ☐ Confirm that all samples are present, and that any sediment samples needed are removed before sieving
- ☐ Label side and lid of jar
- ☐ Include rite-in-the-rain label inside jar
- ☐ Initial and date sample sheet
- ☐ Let sorters know that samples are ready for sorting, and if necessary transport to a different sorting station (i.e. Vallejo). For Nisqually, FedEx with dry ice, and send notifications for *each* shipment.

Sorting:

- ☐ Confirm that all labels on and inside jar correspond
- ☐ Label side and lid of each vial with information from jar and taxon (e.g. Cumacea, Gastropoda) AND write date of sorting and your initials on side label
- ☐ Initial, date, and include number of vials for your sample on sample sheet
- ☐ Wrap a piece of colored tape (e.g. yellow, green) around base of jar and write "Finished" on both lid and side of jar
- ☐ Record the sample number on vial storage box label, making sure that the correct project and core collection date are on the label

Identification:

(This will be further edited once identification goals are determined)

- ☐ Ensure that all vials are present before beginning to sort sample
- ☐ Label vials with all sample information, taxon, and number of individuals AND date of identification and your initials
- ☐ On identification sheet, include your initials, date, taxon, number of individuals and, if applicable, any measurements such as wet mass and lengths. Separate data sheets may be necessary.
- ☐ Vials will either be placed into a label Ziploc bag or labeled box. If samples will be kept in a bag, parafilm may be necessary to prevent desiccation of the samples

Data Entry:

- ☐ Initial and date each page you enter
- ☐ If data entry is error checked, include checked by and date

The Stereo Dissection Microscope

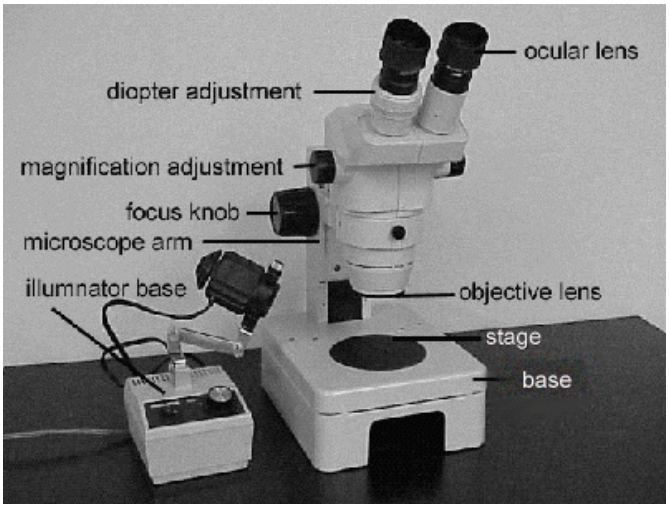
From: http://abacus.bates.edu/~ganderso/biology/resources/diss_scope.html

The dissecting microscope is configured to allow low magnification of three-dimensional objects- objects larger or thicker than the compound microscope can accommodate. Furthermore, the two separate lenses of the binocular dissecting microscope allow one to see objects in three dimensions, i.e., in stereo. Dissecting microscopes do not magnify to the extent of compound microscopes. The microscope models we have in the Biology Department magnify from about 10X up to 40X with either variable or zoom magnification.

Illumination

Dissecting microscopes utilize two types of light: from incident light (direct illumination) or from transmitted light. Opaque objects placed on the microscope stage can be directly illuminated with incident light from an illuminator. In this case the illuminator can be mounted in an opening in the arm of the microscope, or in an adapter ring attached to a separate illuminator base (transformer). Alternatively, light from a source such as a lamp can be reflected through a translucent object from underneath using the substage mirror. This method of illumination requires the clear glass insert in the microscope stage. However, in most instances the opaque stage insert, which has a white side and a black side, and direct lighting is most commonly used. You likely will see different types of illuminators available in lab.

Procedure



1. ALWAYS carry the microscope with TWO HANDS. This practice helps prevent bumping and dropping accidents that jar lenses out of alignment. Grasp the microscope arm with one hand and support the microscope under the base with the other hand. Remove the dust cover and put it in the microscope cabinet.
2. Obtain a suitable specimen (object) to view, and place it in a shallow container on the stage.
3. Position the illuminator next to the microscope directing the beam at the specimen, and turn it on. Many illuminators have rheostats to allow adjustment of

the intensity of the light. Do not use more light than you need, as the image quality will degrade.

4. Adjust the magnification to its lowest power with the magnification knob on the top or side of the microscope body.
5. Adjust the interpupillary distance of the ocular lenses. Look through the ocular lenses. If you see one image, no adjustment is necessary. If you see two images, or a lot of black, adjust the distance between the ocular tubes until you see one image. You also may need to move your eyes closer to or farther away from the ocular lenses so that the specimen's image fills the lenses.
6. You may need to adjust the ocular lenses far apart or close together.


7. Focus on the specimen. This is a two-step process. In the first step, you will roughly focus on the specimen with the objective lens. In the second step, you will compensate for any differences in strength between your eyes to obtain the sharpest image possible.
8. Rough focus

   a. Lower the microscope body to its lowest point with the focusing knob on the sides of the microscope arm. Use the focus knob to raise the microscope body until the specimen image is the sharpest.

   Compensation

   b. Compensate for any differences in strength between your eyes. (The following directions are written for microscopes with diopter adjustment rings on the right ocular tube. Obviously, if you have a scope with the diopter adjustment on the left ocular tube, you will start with your right eye closed.)

   c. Close your left eye. Adjust the diopter adjustment ring until the image is in focus for your right eye. You may want to adjust the ring back and forth (i.e., in and out of focus) a few times until you are sure you have the best focus for yourself.

   d. The first time through the diopter adjustment you may want to repeat steps a through d-sometimes our eyes automatically compensate for out-of-focus images seen in the microscope, and eyestrain results. Who wants a headache in bio lab??
9. If you change the magnification, you may need to adjust the focus again.

Tips for Using a Microscope

From: http://ergonomics.ucla.edu/Tips_Microscope.html

- Use a chair that provides good back support.
- Sit close to your work surface.
- Remove false fronts and supplies from under the bench work area.
- Avoid leaning on hard edges.
- Pad forearms and edges.
- Keep elbows close by your sides.
- Work with wrists in straight, neutral positions.
- Adjust your chair, workbench, or microscope as needed to maintain an upright head position.
- Elevate, tilt or move the microsocpe close to the edge of the counter to avoid bending your neck.
- Use adjustable eye-pieces or mount your microscope on a 30° angle stand for easier viewing.
- Keep scopes repaired and clean.
- Spread microsope work throughout the day and between several people, if possible.
- Take breaks. Every 15 minutes, close your eyes or focus on something in the distance. Every 30-60 minutes, get up to stretch and move.

Tips for Laboratory Workers

From: http://ergonomics.ucla.edu/Tips_Lab.html

Many tasks performed in research laboratories place workers at risk of muscle and joint aches and strains. Activities such as using pipettes, microscopes, microtomes, and centrifuges can put stress on your body. Use the following tips to lower your exposure to risk:

BE AWARE OF YOUR POSTURE

- Sit against the back of your chair. If you sit back and your feet dangle, lower the chair or adjust the foot ring or get a footrest.
- Try tilting the seat forward or use a seat wedge to work in a forward posture without leaning or jutting your head forward.
- Always try to work at a bench cut out. Cut outs can help you get close to your work while sitting against the back of your chair.
- Don't jut your chin forward when working. Adjust the position of your work, the worksurface, or the chair to sit in an upright, supported position.
- Keep frequently used trays and supplies within close reach.
- If standing for long periods, use supportive shoes and cushioned mats.

KEEP ARMS AND HANDS RELAXED

- Keep your shoulders relaxed and your elbows close to your sides when working. Avoid reaching out to use instruments and work materials.
- Maintain neutral or aligned wrist and arm postures when working. Sit close to your work area, keep objects close, and adjust your chair to match the height of the bench.
- Avoid repetitive or forceful twisting and turning motions (i.e. opening valves or adjusting microscopes). Make sure valves and knobs are clean and in good working order.
- Work with your wrist in a neutral or straight position as if you were shaking hands with someone.
- Use electronic pipettes or light touch models whenever possible.
- Select equipment and tools that are the right size for your hand.
- Use padding and tubing to reduce pressure and force when working. For example, use rubber tubing on forceps.to increase diameter and reduce pinch force. Soften sharp edges on work surfaces with padding.
- Use thin, flexible gloves that fit properly. Ill fitting and poorly designed gloves increase pinch and grip forces when working.

AVOID STATIC POSITIONS

- Weight shift often when standing to work. Use a stool or shelf to prop up a foot to relieve pressure on your back.
- Alternate how you hold objects like forceps. Switch holding with the thumb and index finger, and the index and middle fingers to vary the task.
- Vary activities. Change your position and take breaks every 20 minutes to rest muscles to rest and increase blood flow and circulation.

Materials Safety Data Sheets (MSDS)

A Material Safety Data Sheet (MSDS) is designed to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance. MSDS's include information such as physical data (melting point, boiling point, flash point etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, andspill/leak procedures. These are of particular use if a spill or other accident occurs.

MSDS sheets for invertebrate sample handling are included here and are located in the binder within the laboratory and also in the Office Safety binder.

Material Safety Data Sheet
Sodium hexametaphosphate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium hexametaphosphate

Catalog Codes: SLS2209

CAS#: 10124-56-8 or 68915-31-1

RTECS: OY3675000

TSCA: TSCA 8(b) inventory: Sodium hexametaphosphate

CI#: Not available.

Synonym: Calgon, HMP, Medi-Calgon, SHMP; Sodium Polyphosphates; Glassy; Sodium Polymetaphosphate; Sodium phosphate glass; Polyphosphoric Acids, sodium salts

Chemical Name: Metaphosphoric Acid, hexasodium salt

Chemical Formula: (NaPO3)n or (NaPO3)*6 or O18-P6.6Na

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hexametaphosphate	10124-56-8 or	100
	68915-31-1	

Toxicological Data on Ingredients: Sodium hexametaphosphate: ORAL (LD50): Acute: 6200 mg/kg [Rat]. 4320 mg/kg [Mouse]. 3053 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion. Slightly hazardous in case of skin contact (irritant, sensitizer), of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When heated to decomposition it emits highly toxic fumes of ohosphoxides and Na2O. Behavior in a fire: It may melt with loss of steam.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystals solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: (101.96)*6 or 611.52 g/mole

Color: White.

pH (1% soln/water): 7 [Neutral.]

Boiling Point: 1500°C (2732°F)

Melting Point: 550°C (1022°F)

Critical Temperature: Not available.

Specific Gravity: Density: 1.25 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Easily soluble in cold water, hot water. Soluble in water, but it dissolves slowly. Depolymerizes in aqueous solutions to form sodium trimetaphosphate and sodium orthophosphates. Insoluble in organic solvents.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Slightly corrosive in presence of steel.

Special Remarks on Reactivity: Hygroscopic; keep container tightly closed.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 3053 mg/kg [Rat].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant, sensitizer), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Potential Health Effects: Skin: May cause skin irritation. Eyes: Causes eye irritation. Inhalation: May cause respiratory tract irritation. Symptoms may include coughing and shortness of breath. Ingestion: Phosphates are slowly and incompletely absorbed when ingested, and seldom result in systemic effects. However, such effects have occurred. May cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea. May affect behavior/central nervous system/peripherial nervous system (somnolence, convulsions, lethargy, flaccid paralysis), urinary system (kidneys- renal failure, acute tubular necrosis). It may also cause heart disturbances (fall in blood pressure, slow pulse) and blood chemistry effects (reduction of serum level of calcium). The toxicity of phosphates is because of their ability to sequester calcium. Systemic metabolic acidosis may result as this material is believed to be hydrolyzed to ortho phosphates when ingested (before absorption). Tetany may also occur as a result of reduction in serum level of ionic calcium.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Sodium hexametaphosphate Massachusetts RTK: Sodium hexametaphosphate New Jersey: Sodium hexametaphosphate TSCA 8(b) inventory: Sodium hexametaphosphate

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R36- Irritating to eyes. S24/25- Avoid contact with skin and eyes. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

Other Special Considerations: Not available.

Created: 10/09/2005 06:32 PM

Last Updated: 11/01/2010 12:00 PM

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Material Safety Data Sheet
Ethyl Alcohol 190 Proof MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethyl Alcohol 190 Proof

Catalog Codes: SLE1036, SLE1609, SLE1288

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Water; Ethyl alcohol 200 Proof

CI#: Not applicable.

Synonym: Ethyl Alcohol 190 Proof

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Water	7732-18-5	5
Ethyl alcohol 200 Proof	64-17-5	95

Toxicological Data on Ingredients: Ethyl alcohol 200 Proof: ORAL (LD50): Acute: 7060 mg/kg [Rat]. 3450 mg/kg [Mouse]. VAPOR (LC50): Acute: 20000 ppm 8 hours [Rat]. 39000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), . Slightly hazardous in case of skin contact (permeator), of ingestion. Non-corrosive for skin. Non-corrosive to the eyes. Non-corrosive for lungs.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer) CARCINOGENIC EFFECTS: Classified PROVEN by State of California Proposition 65 [Ethyl alcohol 200 Proof]. Classified A4 (Not classifiable for human or animal.) by ACGIH [Ethyl alcohol 200 Proof]. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. [Ethyl alcohol 200 Proof]. Mutagenic for bacteria and/or yeast. [Ethyl alcohol 200 Proof]. TERATOGENIC EFFECTS: Classified PROVEN for human [Ethyl alcohol 200 Proof]. DEVELOPMENTAL TOXICITY: Classified Development toxin [PROVEN] [Ethyl alcohol 200 Proof]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE] [Ethyl alcohol 200 Proof]. The substance is toxic to blood, the reproductive system, liver, upper respiratory tract, skin, central nervous

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: The lowest known value is 363°C (685.4°F) (Ethyl alcohol 200 Proof).

Flash Points: CLOSED CUP: 18.5°C (65.3°F).(estimated)

Flammable Limits: The greatest known range is LOWER: 3.3% UPPER: 19% (Ethyl alcohol 200 Proof)

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks, of reducing materials, of combustible materials, of organic materials, of metals, of acids, of alkalis.

Explosion Hazards in Presence of Various Substances:
Slightly explosive in presence of open flames and sparks, of heat, of oxidizing materials, of acids. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Containers should be grounded. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME Vapor may travel considerable distance to source of ignition and flash back. May form explosive mixtures with air. Contact with Bromine pentafluoride is likely to cause fire or explosion. Ethanol ignites on contact with chromyl chloride. Ethanol ignites on contact with iodine heptafluoride gas. It ignites than explodes upon contact with nitrosyl perchlorate. Additon of platinum black catalyst caused ignition. (Ethyl alcohol 200 Proof)

Special Remarks on Explosion Hazards:
Ethanol has an explosive reaction with the oxidized coating around potassium metal. Ethanol ignites and then explodes on contact with acetic anhydride + sodium hydrosulfate (ignites and may explode), disulfuric acid + nitric acid, phosphorous(III)

oxide platinum, potassium-tert-butoxide+ acids. Ethanol forms explosive products in reaction with the following compound : ammonia + silver nitrate (forms silver nitride and silver fulminate), iodine + phosphorus (forms ethane iodide), magnesium perchlorate (forms ethyl perchlorate), mercuric nitrate, nitric acid + silver (forms silver fulminate) silver nitrate (forms ethyl nitrate) silver(I) oxide + ammonia or hydrazine (forms silver nitride and silver fulminate), sodium (evolves hydrogen gas). Sodium Hydrazide + alcohol can produce an explosion. Alcohols should not be mixed with mercuric nitrate, as explosive mercuric fulminate may be formed. May form explosive mixture with manganese perchlorate + 2,2-dimethoxypropane. Addition of alcohols to highly concentrate hydrogen peroxide forms powerful explosives. Explodes on contact with calcium hypochlorite Vapor may explode if ignited in an enclosed area. Containers may explode when heated or involved in a fire. (Ethyl alcohol 200 Proof)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Do not store above 23°C (73.4°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Ethyl alcohol 200 Proof TWA: 1900 (mg/m3) from OSHA (PEL) [United States] TWA: 1000 (ppm) from OSHA (PEL) [United States] TWA: 1900 (mg/m3) from NIOSH [United States] TWA: 1000 (ppm) from NIOSH [United States] TWA: 1000 (ppm) [United Kingdom (UK)] TWA: 1920 (mg/m3) [United Kingdom (UK)] TWA: 1000 STEL: 1250 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Alcohol like. Mild to strong. Like wine or whiskey; Ethereal, vinous. Pleasant.

Taste: Burning. Pungent.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Neutral.

Boiling Point: The lowest known value is 78.5°C (173.3°F) (Ethyl alcohol 200 Proof). Weighted average: 79.58°C (175.2°F)

Melting Point: May start to solidify at -114.1°C (-173.4°F) based on data for: Ethyl alcohol 200 Proof.

Critical Temperature: The lowest known value is 243°C (469.4°F) (Ethyl alcohol 200 Proof).

Specific Gravity: Weighted average: 0.8 (Water = 1)

Vapor Pressure: The highest known value is 5.7 kPa (@ 20°C) (Ethyl alcohol 200 Proof). Weighted average: 5.53 kPa (@ 20°C)

Vapor Density: The highest known value is 1.59 (Air = 1) (Ethyl alcohol 200 Proof). Weighted average: 1.54 (Air = 1)

Volatility: Not available.

Odor Threshold: 100 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:
Easily soluble in cold water, hot water, methanol, diethyl ether. Soluble in acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, heat, sources of ignition.

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ethanol rapidly absorbs moisture from the air. Can react vigorously with oxiders. The following oxidants have been demonstrated to undergo vigorous/explosive reaction with ethanol: barium perchlorate, bromine pentafluoride, calcium hypochlorite, chloryl perchlorate, chromium trioxide, chromyl chloride, dioxygen difluoride, disulfuryl difluoride, fluorine nitrate, hydrogen peroxide, iodine heptafluoride, nitric acid nitrosyl perchlorate, perchloric acid permanganic acid, peroxodisulfuric acid, potassium dioxide, potassium perchlorate, potassium permanganate, ruthenium(VIII) oxide, silver perchlorate, silver peroxide, uranium hexafluoride, uranyl perchlorate. Ethanol reacts violently/expodes with the following compounds: acetyl bromide (evolves hydrogen bromide) acetyl chloride, aluminum, sesquibromide ethylate, ammonium hydroxide & silver oxide, chlorate, chromic anhydride, cyanuric acid + water, dichloromethane + sulfuric acid + nitrate (or) nitrite, hydrogen peroxide + sulfuric acid, iodine + methanol + mercuric oxide, manganese perchlorate + 2,2-dimethoxy propane, perchlorates, permanganates + sulfuric acid, potassium superoxide, potassium tert-butoxide, silver & nitric acid, silver perchlorate, sodium hydrazide, sulfuric acid + sodium dichromate, tetrachlorisilane + water. Ethanol is also incompatible with platinium, and sodium. No really safe conditions exist under which ethyl alcohol and chlorine oxides can be handled. Reacts vigorously with acetyl chloride (Ethyl alcohol 200 Proof)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 3632 mg/kg (Mouse) (Calculated value for the mixture).

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified PROVEN by State of California Proposition 65 [Ethyl alcohol 200 Proof]. Classified A4 (Not classifiable for human or animal.) by ACGIH [Ethyl alcohol 200 Proof]. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. [Ethyl alcohol 200 Proof]. Mutagenic for bacteria and/or yeast. [Ethyl alcohol 200 Proof]. TERATOGENIC EFFECTS: Classified PROVEN for human [Ethyl alcohol 200 Proof]. DEVELOPMENTAL TOXICITY: Classified Development toxin [PROVEN] [Ethyl alcohol 200 Proof]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE] [Ethyl alcohol 200 Proof].

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Published Dose/Conc: LDL[Human] - Route: Oral; Dose: 1400 mg/kg LDL[Human child] - Route: Oral; Dose: 2000 mg/kg LDL[Rabbit] - Route: Skin; Dose: 20000 mg/kg (Ethyl alcohol 200 Proof)

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenic) Causes adverse reproductive effects and birth defects (teratogenic) , based on moderate to heavy consumption. May cause cancer based on animal data. Human: passes through the placenta, excreted in maternal milk. (Ethyl alcohol 200 Proof)

Special Remarks on other Toxic Effects on Humans:
Acute potential health effects: Skin: causes skin irritation Eyes: causes eye irritation Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea, and alterations in gastric secretions. May affect behavior/central nervous system (central nervous system depression - amnesia, headache, muscular incoordination, excitation, mild euphoria, slurred speech, drowsiness, staggaring gait, fatigue, changes in mood/personality, excessive talking, dizziness, ataxia, somnolence, coma/narcosis, hallucinations, distorted perceptions, general anesthetic), peripherial nervous system (spastic paralysis)vision (diplopia). Moderately toxic and narcotic in high concentrations. May also affect metabolism, blood, liver, respiration (dyspnea), and endocrine system. May affect respiratory tract, cardiovascular(cardiac arrhythmias, hypotension), and urinary systems. Inhalation: May cause irritation of the respiratory tract and affect behavior/central nervous system with symptoms similar to ingestion. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may casue dermatitis, an allergic reaction. Ingestion: Prolonged or repeated ingestion will have similiar effects as acute ingestion. It may also affect the brain. (Ethyl alcohol 200 Proof)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethanol (Ethyl alcohol 200 Proof) UNNA: 1170 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Ethyl alcohol 200 Proof (in alcoholic beverage) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Ethyl alcohol 200 Proof (in alcoholic beverage) Connecticut hazardous material survey.: Ethyl alcohol 200 Proof Illinois toxic substances disclosure to employee act: Ethyl alcohol 200 Proof Rhode Island RTK hazardous substances: Ethyl alcohol 200 Proof Pennsylvania RTK: Ethyl alcohol 200 Proof Florida: Ethyl alcohol 200 Proof Minnesota: Ethyl alcohol 200 Proof Massachusetts RTK: Ethyl alcohol 200 Proof Massachusetts spill list: Ethyl alcohol 200 Proof New Jersey: Ethyl alcohol 200 Proof TSCA 8(b) inventory: Water; Ethyl alcohol 200 Proof

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. S7- Keep container tightly closed. S16- Keep away from sources of ignition - No smoking.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:28 PM

Last Updated: 11/01/2010 12:00 PM

Material Safety Data Sheet
Rose Bengal MSDS

Section 1: Chemical Product and Company Identification

Product Name: Rose Bengal

Catalog Codes: SLR1387

CAS#: 632-69-9

RTECS: LM5920000

TSCA: TSCA 8(b) inventory: Rose Bengal

CI#: 45440

Synonym: Acid Red 94; 4,5,6,7-Tetrachloro-3',6'-dihydroxy-2',4',5',7'-tetraiodospiro[isobenzofuran-1(3H),9'-[9H]xanthen]-3-one dipotassium salt

Chemical Name: Not available.

Chemical Formula: C20H2O5Cl4I4Na2O5

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Rose Bengal	632-69-9	100

Toxicological Data on Ingredients: Rose Bengal LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of skin contact (irritant), of eye contact (irritant). Very hazardous in case of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Extremely hazardous in case of eye contact (irritant). Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds. Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 1017.65 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Decomposes.

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of skin contact (irritant). Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Rose Bengal

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 06:22 PM

Last Updated: 11/01/2010 12:00 PM

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