Laboratory Safety & Compliance

Saint Louis University
Environmental Health and Safety
Research Integrity and Safety Group
Office of the Vice President for Research
Medical Center - Caroline Suite C305

What are the Regulatory and Training Requirements For Laboratory Employees?

Occupational Safety and Health Administration

- Bloodborne Pathogens Standard (29 CFR 1910.1030)
  - The standard applies to all employees who have occupational exposure to blood or other potentially infectious materials (OPIM)
  - Annual online training requirement
    - MySLU>Skillsoft>Bloodborne Pathogens Awareness
  - Exposure Control Plan available online

- Laboratory Standard (29 CFR 1910.1450)
  - Occupational Exposure to Hazardous Chemicals in Laboratories
    - Chemical Hygiene Plan requirement

  - Disclose toxic and hazardous substances in the workplace
  - Includes requirements for training, labels, safety data sheet information and exposure monitoring

- Globally Harmonized System (GHS)
  - Pictograms
  - Standardized Safety Data Sheets (SDS)
  - Signal Words
    - Warning – less severe
    - Danger – more severe

GHS - Hazard Pictograms and correlated exemplary Hazard Classes

SDS (Safety Data Sheet)
Labeling Chemical Containers

- **Original Product Containers**
  - Label will have all required information

- **Secondary Containers** - Chemicals transferred from original containers
  - Chemical Name (no abbreviations)
  - Hazard class
  - Chemical Concentration (if applicable)

Exposures

**Potential exposure to biological, chemical or radioactive materials**

- **Inhalation** (Breathe in a hazard)
  - Remove exposed personnel to fresh air

- **Ingestion** (Swallow a hazard)
  - Improperly stored/handled items (food, pens, papers, tobacco products, etc.)
  - Contact Public Safety to contact Poison Control

- **Skin or Eye Contact** (Absorbed through direct skin or eye contact)
  - Improperly stored/handled items (clothing, pens, papers, contact lenses, etc.)
  - Splashes/spills
  - Wash/flush the area with water

- **Injection** (Contaminated object breaks the skin)
  - Needles, broken glass, animal bites/scratches, etc.
  - Wash the area with soap and water

Personal Protective Equipment

- **Eye Protection**
  - Wear what is appropriate for the hazard (safety glasses, goggles, etc.)

- **Gloves**
  - Nitrile, Latex, Vinyl, etc.

- **Lab Coats**

- **Closed-Toed Shoes**

- **Respiratory Protection**
  - Medical Questionnaire
  - Respirator Fit Test
  - Respirator Training

- **Pants**
  - No Shorts in laboratory

Chemical Exposure Monitoring

- Exposure monitoring is available for all employees working with chemicals

- Chemical Monitoring Devices (badges) are used to monitor an employee's work exposure

- Results are compared to the OSHA Permissible Exposure Limits (PEL's) that are found on the Safety Data Sheets.

- Contact EHS with any Indoor Air Quality concerns

Hierarchy of Controls

- **Elimination**
  - Physically remove the hazard

- **Substitution**
  - Replace the hazard

- **Engineering Controls**
  - Isolate people from the hazard

- **Administrative Controls**
  - Change the way people work

- **PPE**
  - Protect the worker with Personal Protective Equipment

Personal Protective Equipment Gloves Use

- Choose proper gloves

- Wash hands regularly

- Inspect gloves before and during use

- All gloves are porous – **CHANGE REGULARLY**

- **Do not** re-use disposable gloves

- **Do not** wear gloves outside the laboratory
**Laboratory Inspections**

- Inspection checklists are available on the EHS website
  - Review the inspection items regularly
  - Keep compliance records in the lab
    - Training certificates, Safety Data Sheets
  - A fume hood test will be conducted annually

**Laboratory Hazard Signage**

- Contact EHS to update signage (oehs.slu.edu)
- Lab Contact can be a lab phone number
- Emergency Contact should be a cell number reachable 24 hrs.

**Chemical Storage in the Lab**

- Designate storage for food and beverages outside of the lab
- Keep hazardous chemicals below eye level
- Store incompatibles in separate containment
- Use designated storage cabinets for acids and flammables
- **NEVER** store chemicals on the floor
- Check shelf-life periodically

**Gas Cylinders**

- Ensure contents of cylinders are properly identified
- Keep cylinders capped until gas is ready to be used
- Keep gas cylinders upright and secure at all times
- Use cylinder carts to move cylinders — Do Not "Roll" or “Walk" cylinders
- Do not force connection fittings or tamper with safety devices in cylinder valves or regulators

**Fume Hood Guidelines**

- Keep sash at the appropriate height
- Keep items six inches from the front
- All containers must be capped, labeled, and in good condition
- Do not block the opening at the back of the hood
- Keep the fume hood organized and clean regularly

- Fume hoods are certified annually by EHS

**Safety Shower / Eyewash Station**

- Document weekly inspections of the eyewash in your laboratory
  - Ensure it is functioning properly
  - Allow debris to be flushed from the plumbing weekly and after building water has been shut off
- Do not block access to the safety shower/eyewash
- Facilities Service Request
  - myslu.slu.edu
  - 977-2955 (Urgent Requests!)
Laboratory Specific Training

- Must be completed and documented for all personnel working in the lab
- Identify hazards and safety features present in your lab
- Review SOPs for work with certain chemicals:
  - carcinogens
  - cryogenics
  - gas cylinders

ChemKlenz

- Currently available in all buildings with laboratories
- Small spills – contact Renee Knoll to report and for disposal of waste
- Large spills – contact DPSEP at 977-3000
- Waste is considered hazardous and must be disposed of by Environmental Safety

Mercury Thermometer Trade-In

Hazardous Waste

- Any waste (liquid, solid, gas, sludge) that because of its quantity or characteristics may pose a threat to human health or the environment
- If it is ignitable, corrosive, reactive, biological, or toxic
- Examples include, but are not limited to:
  - Flammable and non-flammable solvents
  - Corrosives – acids & bases (caustics)
  - Oxidizers – nitric acid, nitrates, hydrogen peroxide, sulfuric acid
  - Reactives – hydrides, azides, picric acid
  - Toxics – poisons, mutagens, carcinogens, dyes and stains
  - Controlled substances, mercury & other heavy metals
  - Rinse water from "Chromerge," or acutely hazardous chemicals
  - UV germicidal lamps/sodium vapor lamps
  - Paper and cloth rags used to clean solvent spills
  - Photo-fixer, photo-developer, x-ray film

How do I Label Chemical Waste Properly?

- As the generator, you are responsible for chemical waste in your satellite accumulation area. It is your responsibility to:
  - Determine what is "HAZARDOUS WASTE" and label the container properly.
  - Include all the chemical components (solvent versus buffer)
  - Include the accumulation start date
    - Month/Day/Year
  - Request a chemical waste pickup before starting a second container.

How Should Laboratories Dispose of Chemicals?

Chemical Transfer Form

- Online Form
- Preferred Method

Other options:

- Paper, email chemwaste@slu.edu
Laboratory Waste Disposal

- All Hazardous Waste Must Be Collected by Environmental Safety for proper disposal
- Do NOT put hazardous chemicals down sewer drain!
- Dilution/Evaporation is NOT the solution !!!

CONTACT ENVIRONMENTAL SAFETY FIRST!!!

Approved for Regular Trash Disposal
- Paper / Paper Towels / Plastic Gloves (not contaminated)
- Triple rinsed chemical containers
- Non–hazardous solid chemicals
- Lab ware, pipette tips, etc. free of visible chemical contamination
- Class Box – Clean glass and clean broken glass (Must be labeled appropriately for housekeeping staff)

Class A, B, C

Approved for Drain Disposal
- Non–hazardous salt solutions
- Bleach used as a disinfectant
- Buffers (depending on components)
- Non–hazardous chemicals
- Chemicals released during a laboratory process that deems the collection of the chemical impossible or unsafe

Class D

What Can Go Into Glass Disposal Boxes?
- No Mercury Instruments!
- No Mercury Containing Lamps!
- No Sharps!
- Clean Glass (Broken or Unbroken)

Types of Fires
- Class A – Combustible solids (paper, wood, etc)
- Class B – Flammable liquids and gases
- Class C – Electrical (computers, etc)
- Class D – Metals (not common)
- Class K – Cooking oils and fats (Kitchen)

Corridors/Stairways
- Designated safe areas for egress
- Must not be used for storage
- Remove combustible materials and chemicals
- Do not stage equipment in the hallways when being received/moved

Know location (before an emergency):
- Fire extinguishers
- Pull stations (may not be on every floor)
- Fire exits / Evacuation routes

Fire Safety Reminders
- Keep fire doors closed
How to use a Fire Extinguisher

Remember P.A.S.S.
- Pull the pin
- Aim the nozzle at the base of the fire
- Squeeze the handle
- Sweep side to side

** Fire extinguishers are provided for your protection and voluntary use for actual emergencies ** "1 and Done"

General Radiation Safety Awareness

- Restricted Areas
  - These signs indicate restricted areas where radioactive materials are used and stored.
  - Do not be afraid to enter these areas; take appropriate precautions and be respectful of the presence of radioactive material.
- Radioactive Work Areas and Waste Storage Areas
  - Radioactive work areas and waste storage areas are labeled for your safety.
  - Do not attempt to handle equipment or labware in radioactive work areas unless you are trained and authorized.
  - Do not lean on countertops in radioactive work areas.
  - Do not attempt to handle radioactive waste or containers unless you are trained and authorized.
  - Do not handle any items marked “RADIOACTIVE” whether handwritten or marked with yellow/magenta trefoil labels unless you are trained and authorized to do so.

Radioactive Work Areas and Waste Storage Areas

- These signs indicate restricted areas where radioactive materials are used and stored.
- Do not be afraid to enter these areas; take appropriate precautions and be respectful of the presence of radioactive material.

Minors in Labs

- Applies to all minors (STARS and Non-STARS) in the laboratory.
- Must be approved by EHS

Questions / Comments

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Biological Safety
Biosafety Levels (BSL)

- BSL designation refers to a comprehensive plan for biological containment. This plan includes a Standard of Practices, Equipment, and Facilities.
  - **BSL1**
    - Not known to cause disease in healthy adults
    - Examples: Lactobacillus, Baculovirus
  - **BSL2**
    - Moderate Risk agents present in the community
    - Disease of vary severity
    - Examples: Salmonella, Hepatitis, Herpes Simplex
  - **BSL3**
    - Indigenous or exotic agents, aerosol transmission
    - Serious or potentially lethal infection
    - Examples: Brucella, Rift Valley Fever Virus
  - **BSL4 (not at SLU)**
    - Examples: Ebola, Marburg, Lassa viruses

Regulatory aspects, standards & guidelines

- Occupational Safety and Health Administration (OSHA): Bloodborne Pathogens and the Laboratory Standard for working with SA Toxins
- Department of Health and Human Services (DHHS): Select Agent Program
  - Center’s for Disease Control and Prevention (CDC)
  - Permit requirements
- United States Department of Agriculture (USDA): Select Agent Program
  - Animal Plant and Health Inspection Service (APHIS)
  - Permit requirements
- Department of Transportation (DOT): Shipping
- Federal Aviation Administration (FAA): Shipping
- International Air Transport Association (IATA): Shipping
- NIH Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)

DOT Shippers Training for Regulated Medical Waste

- Training is required for anyone involved in the shipping or transport process
- **Required Shipper’s Training Includes:**
  - General Awareness
  - Safety
  - Function Specific
  - Security Awareness
- DOT (Department of Transportation) – regulates shipments on the ground
- IATA (International Air Transport Association) – regulates shipments in the air

Shipper’s General Awareness (Security)

- Security – awareness is required because hazardous materials can be a threat to homeland security if used for illegitimate purposes.
- Dangerous Goods readied for shipment are a security risk and must be secured from unauthorized access prior to shipment.
- All visitors must be escorted in areas where packaged Dangerous Goods are awaiting shipment.
- Keep laboratory doors and cabinets holding dangerous goods closed and locked.
- Call DPS 977-3000 for any security issues.

Shipping Regulated Medical Waste

- If you ship materials that are classified as dangerous goods (hazardous materials), they must be shipped in accordance with the requirements of 49 CFR, Parts 171–180. – Stericyle Boxes
- Shipping Chemicals – Please contact OEHS prior to shipping ALL CHEMICALS
- Biological agents can be shipped following DOT and/or IATA guidelines. Contact OEHS with any questions about specific online training requirements.
Shipper’s General Awareness (Function Specific Training – Biowaste)

- ALL BIOLOGICAL MATERIAL MUST BE DISPOSED OF PROPERLY
- Two Options:
  - STERICYCLE (Biohazard boxes)
  - AUTOCLAVE (Steam Sterilization)
- Liquid BIOLOGICAL waste:
  - 1:9/10% bleach concentration
  - 24 hours, dump in sink. (Splash Protection)

Biohazard Waste Policy:

For proper closure, DOT requires twisting and tying the red bag in a single knot. Illustration below.

45 Lbs–Lift with one hand test
No red bag should show
(5 Minute upside down holding water)

Registration of Research Protocols

- Institutional Biosafety Committee (IBC)
  - Biological
- Radiation Safety Committee (RSC)
  - Radiological
- Institutional Animal Care and Use Committee (IACUC)
  - Animals
- Institutional Review Board (IRB)
  - People

NIH Guidelines for Recombinant or Synthetic Nucleic Acid Molecules (rsNA)

- Research Institutions with NIH funding must register experiments with rsNA molecules.
- 3 General Categories for Research
  - Experiments Requiring Prior Approval
  - Experiments Requiring IBC Notice Simultaneous with Initiation
  - Exempt Experiments
- www4.od.nih.gov/oba/rac/guidelines_02/NIH_Guidelines_Apr_02.htm

Occupational Health Program (OHP) Awareness & Enrollment

- What is the OHP?
  - The OHP is a medical surveillance program for assuring that employees are monitored for occupational exposures to hazardous materials (biological, chemical, or radioactive) and other medical issues.
- How do I enroll?
  - PI will be provided an OHP Medical Questionnaire for you to complete.
  - For work with animals, the PI will also be provided a “Safe Handling of Animals for OHP” form for you to complete.
  - After you complete the form, it must be submitted confidentially (because it contains Personal Health information) to Employee Health.
- Can I opt out?
  - If you choose not to participate in the OHP, you must notify the SLU Employee Health Physician in writing using the “Informed Consent Declination Documentation” form that is the final page of the OHP Medical Questionnaire.
  - Opting out of the OHP may prevent you from participating in certain research that is part of your job. This should be discussed with your supervisor.
Principal Investigators and Managers in labs that work with replication-competent pathogens should:

- Explain symptoms of the pathogen to employees
- Encourage/require self-reporting in the event of illness.

Flush the contaminated area with water for at least 15 minutes
Evacuate the immediate area around a spill, but avoid leaving and tracking the spill to other areas
Call Public Safety at 977-3000
Provide Important Information: Specific hazard name, Exact location, Amount spilled, Phone #
Avoid tracking the hazard into other areas
Avoid inhalation, absorption and/or contamination of the hazard

NEVER leave a message for an emergency !!!

Notify your supervisor immediately, if available.
Determine risk of exposure to a biological agent.
Report incident immediately to Employee Health to determine treatment.
File an incident report as instructed by Employee Health.
Follow Employee Health's recommendations for follow-up treatment.

Puncture & Leak-Resistant
Each lab should have a sharps container
Be aware of your surroundings!
Place ALL SHARPS into an approved SHARPS container.

Metal sharps must be disposed of in an approved Sharps container
If metal sharps are found in the regular trash Housekeeping will not remove trash, contact OEHS

Place all sharps into an approved sharps container.
## Contaminated Glass or Broken Glass Disposal
- Includes Pasteur pipettes, glass serological, Mohr volumetric and transfer pipettes, thin wall test tubes...
- Must not be placed in trash
- Must be placed in a sharps container or sterilized before disposal

## Plastic Items for Regular Trash Disposal
- All of the items pictured are allowed in the regular trash as long as they are not contaminated with chemicals, infectious material or radioactive material

## Biohazard Labels:
- OSHA requires biohazard labels to be affixed to containers, refrigerators and freezers containing human BBPs or OPIMs [29 CFR 1910.1030(g)(1)(i)(A)].
- Labels shall be fluorescent orange or orange–red with lettering and symbols in a contrasting color.
- BSL–2 (agents in use) and BSL–3 laboratories require biohazard labels as noted in the BMBL, 5th ed., 2007.

## Surface Decontamination
- 10% Bleach, 70% Ethanol
- Halogens (Sodium and Calcium hypochlorite)
- Quaternary Ammonium Compounds
- Phenolics (Lysol) – numb skin – poor choice of disinfectant.
- Aldehydes (Formalin)
- Hydrogen peroxide
- Fuzion
- BOTTOM LINE – Use a disinfectant that is proven to provide kill of the agent with which you’re working.

## Certification of Biological Safety Cabinets
- “It is imperative that Class I and II biological safety cabinets be tested and certified in situ at the time of installation within the laboratory, at any time the BSC is moved, and at least annually thereafter.”
  - CDC’s Biosafety in Microbiological and Biomedical Laboratories (BMBL), 5th ed., Feb 2007.
- Midwest Mechanical is a reputable vendor.
  - [www.mmlss.com](http://www.mmlss.com)
- It is the responsibility of the laboratory to maintain annual certification of your Biological Safety Cabinets (BSC’s).

## Biosafety Cabinet Use
- No flammable compressed gas
- Keep vents clear of debris, this prevents proper airflow
- Use appropriate disinfectant
- Wear PPE
Needle-Container

Add 10% bleach and empty frequently to avoid contamination.
Label the contents
Flasks and HEPA filters should be in-line to protect the house vacuum.
Use coated glass and/or secondary containment if stored on the floor

Select Agents and Toxins Awareness:

- Restricted work, unless approved by RO, IBC, and CDC
- YOU MUST BE APPROVED TO ACCESS AGENT
- Covers ALL who have access to Select Agents and Toxins
- High-level of federal-level security and scrutiny
- Extensive training to work with agents.

RO: Mark Campbell
ARO: Mark Haenchen and Patricia Osmack

Where to go for Select Agent information?

- Biosafety Officer/Responsible Official (RO)
  - (314) 977-6888
- ALL SA ACTIVITIES GO THROUGH THE RO!
- Office of Environmental Health and Safety – Caroline Bldg. Rm. 305
- https://www.selectagents.gov/

Environmental Health and Safety Website
slu.edu/ehs

Contact Us!

- Mark Campbell, Ph.D, CBSP, RBP, SM(NRM)
  - Biological Safety Officer and Responsible Official (RO)
  - Phone: 977–6888
  - mark.campbell@slu.edu

- Patricia Osmack
  - IBC Coordinator
  - Phone: 977–6897
  - patricia.osmack@slu.edu

Add 10% bleach and empty frequently to avoid contamination.
Label the contents
Flasks and HEPA filters should be in-line to protect the house vacuum.
Use coated glass and/or secondary containment if stored on the floor
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<td>1. Identification</td>
<td>(a) Product identifier used on the label; (b) Other means of identification; (c) Recommended use of the chemical and restrictions on use; (d) Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party; (e) Emergency phone number.</td>
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<td>2. Hazard(s) identification</td>
<td>(a) Classification of the chemical in accordance with paragraph (d) of §1910.1200; (b) Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200. (Hazard symbols may be provided as graphical reproductions in black and white or the name of the symbol, e.g., flame, skull and crossbones); (c) Describe any hazards not otherwise classified that have been identified during the classification process; (d) Where an ingredient with unknown acute toxicity is used in a mixture at a concentration = 1% and the mixture is not classified based on testing of the mixture as a whole, a statement that X% of the mixture consists of ingredient(s) of unknown acute toxicity is required.</td>
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| 3. Composition/information on ingredients | Except as provided for in paragraph (i) of §1910.1200 on trade secrets: **For Substances**  
(a) Chemical name;  
(b) Common name and synonyms;  
(c) CAS number and other unique identifiers;  
(d) Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance. **For Mixtures**  
In addition to the information required for substances:  
(a) The chemical name and concentration (exact percentage) or concentration ranges of all ingredients which are classified as health hazards in accordance with paragraph (d) of §1910.1200 and  
   (1) are present above their cut-off/concentration limits; or  
   (2) present a health risk below the cut-off/concentration limits.  
(b) The concentration (exact percentage) shall be specified unless a trade secret claim is made in accordance with paragraph (i) of §1910.1200, when there is batch-to-batch variability in the production of a mixture, or for a group of substantially similar mixtures (See A.0.5.1.2) with similar chemical composition. In these cases, concentration ranges may be used. **For All Chemicals Where a Trade Secret is Claimed**  
Where a trade secret is claimed in accordance with paragraph (i) of §1910.1200, a statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required. |
| 4. First-aid measures            | (a) Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion;  
(b) Most important symptoms/effects, acute and delayed.  
(c) Indication of immediate medical attention and special treatment needed, if necessary. |
| 5. Fire-fighting measures        | (a) Suitable (and unsuitable) extinguishing media.  
(b) Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).  
(c) Special protective equipment and precautions for fire-fighters. |
| 6. Accidental release measures   | (a) Personal precautions, protective equipment, and emergency procedures.  
(b) Methods and materials for containment and cleaning up. |
| 7. Handling and storage          | (a) Precautions for safe handling.  
(b) Conditions for safe storage, including any incompatibilities. |
| 8. Exposure controls/personal protection | (a) OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit used or recommended |
by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.
(b) Appropriate engineering controls.
(c) Individual protection measures, such as personal protective equipment.

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| **9. Physical and chemical properties** | (a) Appearance (physical state, color, etc.);
|   | (b) Odor;
|   | (c) Odor threshold;
|   | (d) pH;
|   | (e) Melting point/freezing point;
|   | (f) Initial boiling point and boiling range;
|   | (g) Flash point;
|   | (h) Evaporation rate;
|   | (i) Flammability (solid, gas);
|   | (j) Upper/lower flammability or explosive limits;
|   | (k) Vapor pressure;
|   | (l) Vapor density;
|   | (m) Relative density;
|   | (n) Solubility(ies);
|   | (o) Partition coefficient: n-octanol/water;
|   | (p) Auto-ignition temperature;
|   | (q) Decomposition temperature;
|   | (r) Viscosity. |

**10. Stability and reactivity**
(a) Reactivity;
(b) Chemical stability;
(c) Possibility of hazardous reactions;
(d) Conditions to avoid (e.g., static discharge, shock, or vibration);
(e) Incompatible materials;
(f) Hazardous decomposition products.

**11. Toxicological information**
Description of the various toxicological (health) effects and the available data used to identify those effects, including:
(a) Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);
(b) Symptoms related to the physical, chemical and toxicological characteristics;
(c) Delayed and immediate effects and also chronic effects from short- and long-term exposure;
(d) Numerical measures of toxicity (such as acute toxicity estimates).
(e) Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition), or by OSHA.

**12. Ecological information (Non-mandatory)**
(a) Ecotoxicity (aquatic and terrestrial, where available);
(b) Persistence and degradability;
(c) Bioaccumulative potential;
(d) Mobility in soil;
(e) Other adverse effects (such as hazardous to the ozone layer).

**13. Disposal considerations (Non-mandatory)**
Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.

**14. Transport information (Non-mandatory)**
(a) UN number;
(b) UN proper shipping name;
(c) Transport hazard class(es);
(d) Packing group, if applicable;
(e) Environmental hazards (e.g., Marine pollutant (Yes/No));
(f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code);
(g) Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises.

**15. Regulatory information (Non-mandatory)**
Safety, health and environmental regulations specific for the product in question.

**16. Other information, including date of preparation or last revision**
The date of preparation of the SDS or the last change to it.
GHS - Hazard Pictograms and correlated exemplary Hazard Classes

Physical Hazards
- Explosives, Self-Reactives, Organic Peroxides
- Flammables, Pyrophorics, Self-Heating, Emits Flammable Gas, Self Reactives, Organic Peroxides
- Oxidizers
- Compressed Gases
- Corrosive to Metals

Health Hazards
- Acute Toxicity (Fatal or Toxic)
- Skin Corrosion/Burns, Eye Damage
- Irritant (Skin and Eye), Skin Sensitizer, Acute Toxicity (Harmful), Narcotic Effects, Respiratory Tract Irritant, Target Organ Toxicity, Hazardous to Ozone Layer
- Carcinogen, Mutagenicity, Reproductive Toxicity, Respiratory Sensitizer, Aspiration Hazard

Env. Hazards
- Hazardous to the Aquatic Environment