



**UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA**

**Department of Materials Science and  
Metallurgical Engineering**

**SAFETY AND LABORATORY PRACTICE**

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<b>EMERGENCIES, ACCIDENTS &amp; INJURIES</b>	
<b>WORKING HOURS</b>	<b>AFTER HOURS</b>
<p><b><u>SECURITY SERVICES (ALSO FOR AMBULANCE):</u></b> <b>012 420 2310 (ON ANY INTERNAL PHONE JUST DIAL 2310)</b></p> <p><b><u>OHS REPRESENTATIVE: Sr. Sonja Sauer</u></b> <b>x4409 or 076 641 0206</b></p> <p><b><u>DEPARTMENTAL SAFETY REPRESENTATIVES:</u></b> LEVEL 4 – Mr Sibusiso Mahlalela: x5491 or 078 875 0375 LEVEL 3 – Dr Robert Cromarty: x5922 or 082 445 6559 LEVEL 2 - Mr Rorisang. Maubane: x4631 or 083 609 1163 LEVEL 1 – Mr Mfesane Tshazi: x3301 or 078 351 6132 HOD: Prof Roelf Mostert X4551</p>	
<b>FIRST AIDERS:</b>	
<p><b>Mr. Mfesane Tshazi x3301</b> <b>Mr. Sibusiso Mahlalela x5491</b> <b>Mr Rorisang. Maubane x4631</b></p>	<p><b>Contact one of the departmental safety representatives indicated above.</b></p>
<p><b><u>In general, in case of an emergency:</u></b></p> <ul style="list-style-type: none"><li>▪ <b>Never risk your own safety and remain calm;</b></li><li>▪ <b>Never move a casualty unless necessary; always bring the First Aider to the casualty;</b></li><li>▪ <b>One person should preferably stay with the casualty and another go for help;</b></li><li>▪ <b>Once the First Aider arrives, do as instructed, be prepared to assist but do not interfere.</b></li></ul>	

**FOR SAFETY IS NOT A GADGET BUT A STATE OF MIND ~ELEANOR EVERET**

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## **EMERGENCY CONTACT**

In case of the following:

1. Fire: X 2310
2. Chemical Spillage: X 2310
3. Bomb Scare: X 2310
4. First Aid: X 5491 or X 3301

## **EMERGENCY PROCEDURE**

DON'T PANIC – another few seconds will not make much difference.

PROTECT YOURSELF – make sure you are properly clothed. Overall/dustcoat, gloves, gas mask

GET HELP – sound the alarm, call for help, doctor, ambulance, security, etc.

RESCUE VICTIMS – get them to a safe area. Apply immediate first aid.

ATTEND TO LEAK/SPILL – make safe, clean up and rehabilitate.

## **1. Purpose of this guide**

This guide provides the basic principles of working safely and responsibly in the laboratories of the Department of Materials Science and Metallurgical Engineering.

## **2. Statement of Health Safety Policy**

The University of Pretoria is committed to the highest standards of excellence in education and research. This commitment to excellence applies equally to the way in which the University accepts its responsibilities for the health and safety of all staff, students, visitors and others who may be affected by the activities of the University.

Accordingly, the University will take all reasonable steps necessary to provide a healthy and safe environment for work and study. Compliance with all statutory obligations is the minimum standard. It is the duty of every employee to take care of their own health and safety and that of others who could be affected by their acts or omissions. The University policy on Health and Safety can only be effective if there is a commitment by all staff, students, visitors and others at the University.

## **3. Health and Safety Policy of the University of Pretoria**

It is the University's official policy to protect its employees, students, visitors and property at all times through the implementation programme of excellence. The University acknowledges that specific elements are of importance in the implementation of this policy:

### **3.1 Health and Safety Aspects**

The University is responsible for the design and implementation of practical and workable health and safety standards, methods and systems to comply with prescribed legal requirements.

### **3.2 Safety Instructions**

Safety training must be part and parcel of the normal in-task training for employees.

### **3.3 Responsibility for safety**

Every **employee and student** shall be responsible for maintaining the health and safety policy in such a manner as to safeguard all **people, employees, students and property**. Each undergraduate, graduate student, faculty and staff member working in a research laboratory is expected to:

- Attend Laboratory Safety Training provided by the department.
- Follow procedures and laboratory practices outlined in this training guide and in related

documents about safety, housekeeping and laboratory rules provided by laboratory coordinators and staff members.

- Use engineering controls and personal protective equipment, as appropriate.
- Report all accidents, near misses, and potential chemical exposures to your supervisor and/ or Safety Representative.
- Review and approve work with particularly hazardous substances.

### **3.4 Employee Awareness**

Awareness programmes must be promoted to improve employees and their colleague's interest in safety.

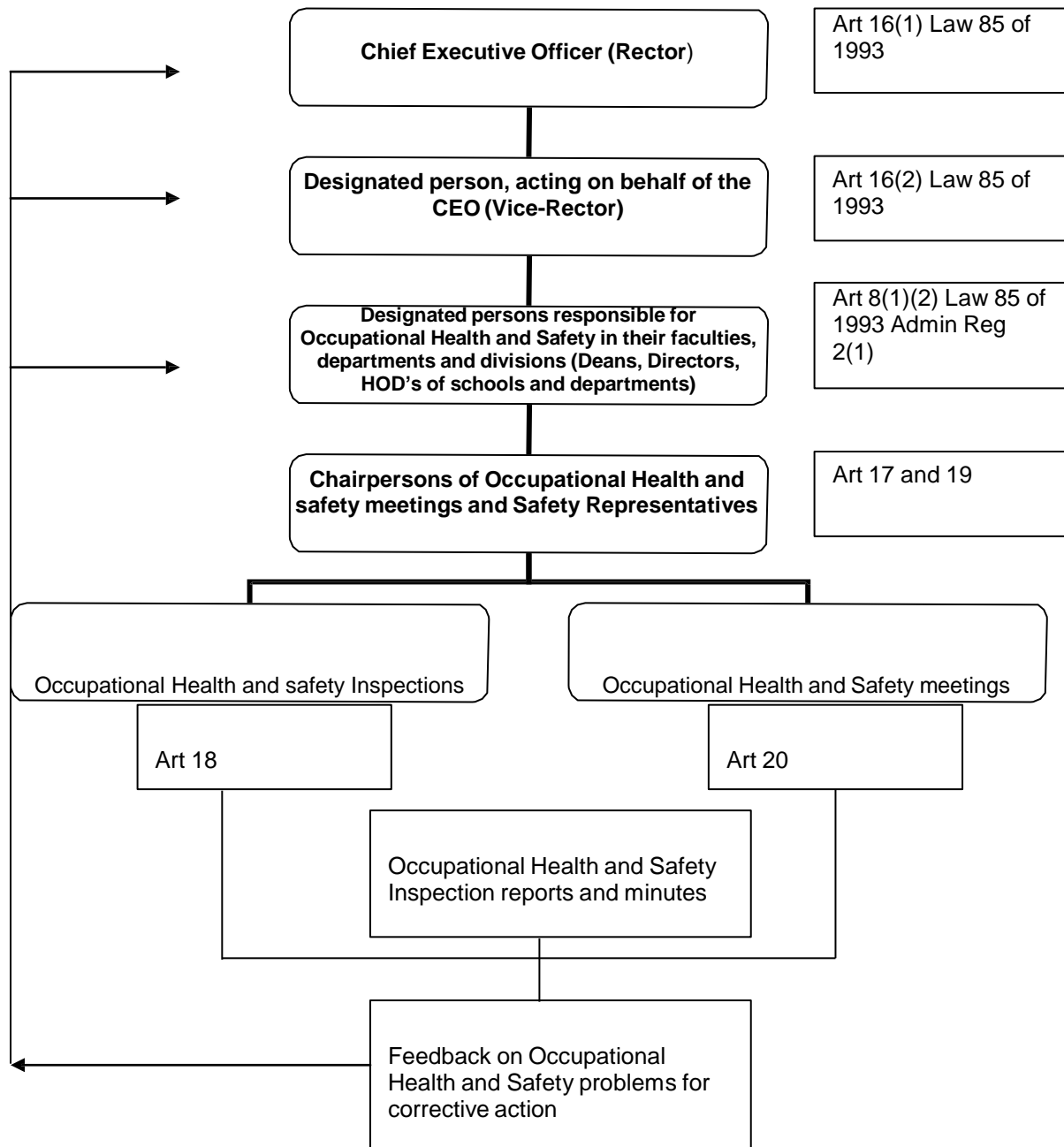
### **3.5 Unhealthy and substandard actions and work procedures**

The University, its employees and students are committed to eliminating all unhealthy and unsafe actions and work procedures.

### **3.6 Legal and statutory responsibilities**

The University is responsible for implementing all legal and statutory requirements that are required by the law.

#### 4. Occupational Health and Safety Management Structure of UP



## **5. Implementation of the Safety Policy of the University of Pretoria**

1. The Safety Policy is formulated to enable the Heads of Department to ensure, as far as is reasonably practical, the health, safety and welfare at work of all staff, students and visitors. The arrangements are formulated on the basis that: (a) in much of the Department's experimental research and teaching, individuals initiate and conduct their work without the instruction of management, and (b) in matters of safety, common sense and a sense of personal responsibility are of fundamental importance.
2. Statements relating to hazards in the Department are formulated and made available to all its members through the Safety Book, which is updated annually.
3. Under the authority of the Head of Department, the Safety Committee is constituted of representatives of all staff, under-graduate and post-graduate students. The Committee oversees the compliance with Safety Policy and endeavours to ensure safe practices. It meets at least once each term, issues minutes which are made publicly available, and reports to staff meetings.
4. All members are issued with the Safety Book each year; newcomers including day visitors are notified about the University and Department Safety regulations.
5. The Safety Officer or a nominee meets all new researcher and students to arrange for appropriate training and tests. Undergraduate students carrying out work in the Department are given Safety instructions before the onset of any practical sessions or laboratory work. Post-graduate students are instructed on Safety matters both by the University Safety Office and through lectures by the Department Safety Committee. All researchers are required to pass a Safety Test before being authorised to work in a laboratory.
6. Before commencing experimental work, study leaders must ensure that risk assessments have been carried out using the "**Risk Assessments Forms**" in Appendix II. The completed forms must be displayed in a conspicuous position and made available to any person in the room or the vicinity of the activity. In addition, the Risk Assessment must be included in all project documentation.
7. Those in a supervisory role are expected to identify the hazards associated with the activities for which he/she bears responsibility, to warn those who may be affected by them and to take steps to ensure that health and safety will not be endangered. All academic and technical supervisors of equipment are required to ensure safe operation, by making risk assessments which are regularly reviewed. The rate of revision of safety assessments will be left to the discretion of the study leader or supervisor of project work.
8. Each individual is required to take responsible care for his/her own health and safety and that of other persons who may be affected by his/her acts or omissions at work. All persons have a duty not to interfere with or misuse anything provided or organised in the interest of health, safety or welfare.

9. All students are responsible to named supervisors for all aspects of their work. A list of supervisors and their students will be compiled and posted on the notice board by the Safety Representative as soon as students have been allocated projects.
10. Building safety inspections are carried out regularly by the Safety Representative. Safety audits are carried as needed by Occupational Health and safety officers. Reports and recommendations for action follow inspections.
11. All incidents and accidents must be reported to the Safety Representative and documented as outlined in appendix.
12. The Safety Representative would then ensure that the incidents are investigated, recommendations made and actions are taken to ensure that Safety procedures are properly functioning and the probability of such incidents and accidents occurring again are minimised. The University Safety Officer is informed about the situation and if necessary, further investigation is carried out in cooperation with the University Safety Officer.
13. Fire precaution procedures are explained to all newcomers to the department. Students are required to attend lectures which deal with the issue. The Safety Officer arranges fire drills on a regular basis.
14. **The safety organisation is available during normal working hours. Additional restrictions apply to essential work done outside normal working hours.** The degrees of risk are in three categories: HIGH, MEDIUM and LOW. Any individual *must*, outside normal working hours, complete the Laboratory After Hours Work Form and comply with the following rules. The forms can be obtained from safety representatives:

**Risk Rating (13 – 20) “A” Work (HIGH risk):** Confined to normal working hours only (Working hours are 08:00 to 16:00). At least one colleague should be present within easy hailing distance.

Typical examples:

- Workshop machine tools;
- Substantial amount of explosive and flammable liquids and gases;
- Molten salt etching of specimen;
- Substantial amount of acids and alkalis;
- Materials or equipment with high explosion potential;
- High voltage supplies;
- Toxic substances /poisons, e.g. Arsenic, Cyanide;
- Any activity using Hydrofluoric Acid.

**Risk Rating (6 – 12) “B” Work (MEDIUM risk):** May be carried out at any time, BUT one other individual (who has passed the departmental safety induction and test and who is familiar with the relevant experiment/equipment in use) must be present throughout the work. This category covers



all work that is not A or C.

**Risk Rating (1 – 5) “C” Work (LOW risk):** This may be carried out at any time. It covers reading, writing and the kind of activities which would not require special precautions if conducted alone in one’s home.

### EXCEPTIONS

Any exceptions to these rules will require the individual to obtain the prior written authority of his/her supervisor and the chairman of the safety committee, specifying the task, time and any special conditions.

15. Individuals are advised, in their own interest, when entering after hours to ensure that their names are entered in the book (on Level 3, In front of Room 3-25).
16. The supervisor of any new project will be responsible for ensuring that the new activities, together with the operation of any new equipment are planned in accordance with safety standards. For all activities the regular maintenance of safety standards is based on four requirements:
  - Individual adherence to laid down operating and reporting procedures;
  - Responsibility of supervisors to see that their subordinates/students have the necessary standard of competence and that they adhere to the laid down safety procedures;
  - Assessment of risks of activities and procedures prior to their being adopted;
  - Periodic safety walks by members of the Department’s Safety Committee.
17. Any potentially dangerous activity or equipment observed by any member of the Department should be brought to the immediate attention of those responsible, and to the Safety Representative. All members of the Department must maintain vigilance on matters concerning safety.

## **6. Safety Officials**

Head of Department	Prof R Mostert <sup>1</sup>	420-4551
Safety Representative – Level 4	Mr Sibusiso Mahlalela	420-5491
Safety Representative – Level 3	Dr Robert Cromarty	420-5922
Safety Representative – Level 2	Mr Rorisang Maubane	420 4631
Safety Representative – Level 1	Mr Mfesane Tshazi	420-3301

### **UP Safety Officers:**

UP OHS Head	Mrs Yolanda Bekeur	420-3308
Accidents & Incidents Coordinator	Ms Carol Mbele	420-3332
Fire Coordinator	Mr Lynley Carols	420-3305
OHS Representative	Mrs Sonja Sauer <sup>1</sup>	420-4409

## **7. Specific Departmental Procedures**

The safety representatives identified in section 6 are responsible to develop and keep available Standard Operating Procedures for all hazardous equipment on the level for which they are responsible. All Standard Operating Procedures will be kept in files clearly marked in the various laboratories. All new students and researchers shall, during the safety induction, be made aware of the location of these files.

## **8. Basic First Aid Principles**

First aid supplies are available from the Laboratory Managers Office (4-3 & 1-15), as well as from the staff kitchen (3-38).

Accidents, however small, should always be treated and if any doubt exists as to the severity of the injury, the Safety Representative must be informed so that the person may be taken to the hospital. All injuries sustained however small including incidents of any kind, even those where no injury was sustained while working in the Department's laboratories or offices must be reported to the Safety Representative and documented as outlined in appendix.

### **8.1 Basic first aid**

#### **8.1.1 Gassing**

Move victim to fresh air. If necessary give mouth to mouth resuscitation using the proper mouthpiece. Treat as stretcher case.

#### **8.1.2 Swallowed**

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<sup>1</sup> All members of the safety committee of the minerals science building, in addition to Ms Lucia Moyo from Geology and Mr Keaton Philo from the Department of Mining Engineering.

Give plenty of water or milk to drink. DO NOT induce vomiting. For cyanide, a breathing apparatus to be used by the first aider. The Anti-dote in the fridge on levels 4 (room 4-5) is to be given to a doctor only. Drench the patient with water, take amyl-nitrite (labelled "Tripac-Cyano) with and accompany the patient to the hospital (do not administer the antidote, only give oxygen).

### **8.1.3 Splashes**

Strip off affected clothing, take care not to smear more of the chemical onto the patient. Shower/wash for at least 20 minutes. A shower is situated in the foyer on level 4.

### **8.1.4 Eye splashes**

Rinse with water for 20 minutes.

## **8.2 Location of First Aid Kits (aside from the basic boxes on each level against the wall)**

- Laboratory Manager's office – room 4-3 (level 4) & room 1-15 (level 1)
- Staff kitchen – room 3-38 (level 3)
- Elsie Snyman-Ferreira's office – room 2-16 (level 2)

## **9. Emergency Exit Routes**

**Emergency exit routes (maps)** are displayed on various locations of the Mineral Science building, familiarise yourself with the routes.

### **Level 1: Two (2) possible routes:**

Out of the sliding gate (break the glass for the key inside the box), go up the ramp and assemble at the emergency assemble point on the grass in front of the Natural Sciences 2 building;

Up the stairs, out by the front door and assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building;

**Level 2: Two (2) possible routes:**

- (a) Exit on the western side of the passage, out by the front door and assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building;
- (b) Exit on the eastern side of the passage, out by the Geology entrance door and assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building;

**Level 3: Two (2) possible routes:**

- (a) Down the main staircase, on the western side of the passage, to the 2<sup>nd</sup> level, exit by the front door and assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building;
- (b) Down the staircase on the eastern side of the passage, to the 2<sup>nd</sup> level, exit by the Geology entrance door and assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building;

**Level 4: Two (2) possible routes:**

- (a) Down the main staircase, until the 2<sup>nd</sup> level and exit by either the front door and assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building.
- (b) Exit using the fire escape on the outside of the building, to access break the glass of the key box and use the exterior door in Laboratory 4-2. Assemble at the emergency assembly point on the grass in front of the Natural Sciences 2 building.

## **10. Fire Safety**

It is the responsibility of everyone to be vigilant and report anything they may see as a fire risk to the Safety Representative. Examples include escape routes and fire extinguishing equipment which may be blocked by equipment or rubbish, un-safe housekeeping practices, etc.

The materials and packing should not be left in the laboratories or corridors but should be disposed of. Polystyrene packing from computers presents a very real risk, as the fumes created by it burning are very toxic.

### **10.1 In the event of a fire**

If the fire is small and can be safely extinguished, do so. Laboratory users should be acquainted with the location and use of the extinguishers. It is essential to use the correct extinguisher, for example NEVER use water to extinguish a fire in the vicinity of electrical appliances or installations. If it is impossible to extinguish the fire, raise the alarm to initiate evacuation and summon help. In the event of an electrical fire, the electrical power must be switched off first.

## 10.2 Fire Extinguishers

These are provided as required by legislation and the University insurers and are chosen to deal with various types of fire. Extinguishers are situated in safe places. When deciding to fight a fire, it is crucial that no personal risks are taken.

## 11. General Health and Safety

### 11.1 Smoking

Smoking is strictly forbidden within the Department.

### 11.2 Gas or Water Leaks

In the event of a gas or water leak, contact the Safety Representative. After hours contact the Security Office on 420-2310 and the emergency contact, whose number is displayed on every level within the department.

## 12. Risk Assessment Information (Refer to Appendix II)

The University of Pretoria is committed to achieving and maintaining the highest standards of health and safety for all employees, students and others who may be affected by the University's activities. This is accomplished by:

- The identification of all workplace hazards;
- The identification of all people who may be exposed to the hazards;
- The evaluation of the significant risks to which employees, students and others are exposed;
- The recognition of the likelihood of foreseeable accidents, injuries or near misses occurring;
- The selection of realistic and practical precautions and control measures;
- Disaster management protocols.

This process is called *Risk Assessment*. A risk assessment is just a careful examination of anything that may cause harm to anyone during their work. Once the assessment is completed, action can be taken to minimise the likelihood of anyone being hurt. The aim is to prevent accident and illness. It is carried out by identifying risk and using appropriate control measures to minimise or eliminate the risk. **Risk assessment of all activities is required by Law. Risk assessments are to be kept on file at the relevant experimental setup (after approval), as well as given to both safety representatives to keep on file.**

**NB:** Students who will need to use the grinding and cutting machine at the workshop are required to watch a video on YouTube named " Heavy Machine Lab Training" from 52minutes until the end  
<https://youtu.be/tZAWydc3czE?t=3121>.

The following terms are referred to in the Risk Assessment form in Appendix II.

## Hazard:

A hazard is anything that may cause harm. Although they may not cause harm in one form, there is always a “What if...?”. Glass bottles can be considered a hazard. They usually are relatively harmless – but what if they are dropped? Electricity is a hazard. While correctly contained it is safe, but what if ...?

Potential hazards include factors such as:

- Mechanical: moving machinery, heavy objects that can tip or fall
- Electrical: risks of electrocution
- Thermal: risk of high or very low temperatures
- Chemical
  - Toxicity: poisonous substance
  - Corrosives: acids, bases, oxidising agent
  - Carcinogenic, mutagenic, teratogenic: substances that cause cancer, mutations or interfere with embryonic development
  - Asphyxiant: substance that displaces oxygen e.g. nitrogen, argon
  - Flammables: substance that can burn
  - Explosives: unstable compound that decomposes rapidly
  - Note sometimes the risks may depend on the form of the substance e.g. many bulk metal are quite safe to work with but may present a fire or explosion risk when finely powdered. Similarly, silica is inert but may pose a health risk (silicosis) in powdered form.
- Compressed gasses:
- Dust: many finely divided substance and fibrous material pose a health risk when inhaled e.g. silica dust, mineral fiber insulation
- Ionizing radiation: radioactive material
- Electromagnetic radiation: microwaves
- Light: intense light from sources such as electric arc, lasers etc.

## Risk:

The risk is primarily the likelihood of something happening. What if the glass bottle is dropped? – There is a risk that someone could be cut or the risk of a hazardous chemical spill. How do we minimise the risk? By using suitable control measures, e.g. using a bottle carriage.

## Control measures:

Often the best control measures will start with the words **DO NOT**. Do not use a glass bottle. This will eliminate the risk altogether (**IT IS VERY WISE WHEN PLANNING TO ELIMINATE RISKS!**). However, there are times when “do not” is not applicable. Persons must aim to reduce the risk if it is not possible to eliminate it. For example, always carry glass bottles in the carriers to prevent them slipping and breaking.

Approved forms for the assessment can be obtained from the Safety Representative. Work should never commence before the assessment has been completed and approved by the Supervisor or Study Leader.

Risk Assessments must be carried out as part of the safety management process and should include looking at the equipment used, the laboratory used and the system of work that is employed. They must be reviewed at specified times, as agreed upon between the student and study leader. The fitness of the workers/students is of the utmost importance.

Health and Safety performance will regularly be monitored to ensure that Risk Assessments are adequate and that the control measurements are being applied and efficiently working. Failure to comply will result in temporary or permanent revocation of laboratory access. The Department follows a ZERO TOLERANCE policy concerning safety.

### **Chemical process risk assessment**

A typical assessment will involve:

- Defining the process, operating conditions and plant;
- Identifying the hazards;
- Evaluating the risks arising from the hazards and deciding whether existing precautions are adequate or more should be done;
- Selecting and specifying appropriate safety measures;
- Implementing and maintaining the selected safety measures;
- Emergency procedures.

Persons **MUST** start the assessment as early as possible during the development of the process/experiment. This assessment should be sufficient to identify the potential hazards and to investigate their causes. Where possible, hazards should be avoided.

A written safe work procedure should culminate from the risk assessment and must be made available to persons performing the work.

## **13. Control Of Substances Hazardous to Health (Refer to Appendix I)**

All members of the Department and students working in the laboratories must conform to Control of Substances Hazardous to Health (COSHH) regulations. COSHH forms must be correctly completed before starting any work involving chemicals. These forms may be obtained from the Safety Representative. Any guidance about the completion of these forms can be obtained from the Supervisor or a member of the Safety Committee.

The COSHH regulations are a legal framework for controlling the exposure of workers to hazardous substances. COSHH requires that no work which is liable to expose anyone to substances hazardous to health shall be carried out until an assessment has been made and appropriate control measures are taken.

### 13.1 Material Safety Data Sheet

Chemical substances that are used in the laboratory carry some risks/hazards. These hazards are outlined in a safety data sheet (SDS). The SDS contains safety procedures for the handling of a particular substance/chemical i.e. to inform the user of potential risks associated. The data sheet typically has 16 sections and students are advised to pay special attention to sections 3 & 11 (hazard information), 4 (first aid information) and 9 (physical & chemical properties). A summary of the hazards can be displayed by the SDS label that highlights four factors health, flammability, reactivity and personal protective equipment. The labels have hazard severity rating ranging from 0 to 4. The information is made available to safeguard the occupational health of users and aid emergency services in case of an incident.

Users of chemicals **MUST** obtain **safety data sheets (SDS)** about these chemicals from the internet:

<https://www.thermofisher.com/za/en/home.html>

<https://www.flinnsci.com/sds/>

<http://www.minema.co.za/>

<https://youtu.be/5Ar0TVkf4HU>

[http://www.merckmillipore.com/ZA/en/support/safety/videos-safety-in-the-laboratory/KWGb.qB.TvYAAFFvK07Qji\\_.nav](http://www.merckmillipore.com/ZA/en/support/safety/videos-safety-in-the-laboratory/KWGb.qB.TvYAAFFvK07Qji_.nav)

See end of the booklet for typical SDS's.

### 13.2 Personal Protection

Various items such as laboratory coats, gloves, eye protection, etc. can be obtained from the Safety Representative.

## 14. Disposal of Hazardous Chemicals and Waste

Strict legislation controls the disposal of chemical waste and clearly defines the Duty of Care of all waste producers regarding the identification, segregation, packaging and transport of waste.

Waste must not be disposed of by discharging into the drains. Always remember to minimise quantities of reagents used to minimise waste.

Hazardous chemicals and laboratory waste for disposal should be in secure containers, clearly labelled as to their contents and also numbered (on lids if in bottles, jars, etc.) according to the item number given to them on the disposal application form.

Bottles, jars, etc should be placed upright in a robust box (e.g. A photocopier paper box with the base reinforced using the lid). Any waste in bags should be doubled bagged.



An application form should be completed in full; no abbreviations are formulae should be used. Brand names are inadequate, consult the SDS for product constituents.

The guidelines for waste disposal consult safety representatives. Ms Nomini Mamahlodi (Nomini.Mamahlodi@up.ac.za) is the overall disposals co-ordinator.

## **15. Highly Flammable Material**

### **14.1 Flammable compressed gases**

Gas cylinders must be secured in a gas bottle stand or chained to the wall. Care must be taken to ensure there are no ignition sources (including sparks) when gases are liberated into the room. All laboratories must have adequate extraction systems and proper ventilation. Ensure that there are no leaks and close the valve when not in use. A mild soap detergent and a soft paintbrush must be used to test for leaks. The correct tubing must be used. Greases and oils must never be allowed to come into contact with compressed oxygen as they can ignite spontaneously.

There must be adequate separation between flammable gases and gases capable of supporting combustion. Everyone working with compressed gas cylinders must take the following precautions:

- Always transport cylinders in a trolley with regulators removed
- Always clamp or chain cylinders. When changing cylinders, never have more loose cylinders than people to control them safely
- Always use the appropriate reduction and safety valves
- Always turn off the main cylinder valve when it is not in use, and use the minimum opening when necessary
- Always test the valves on new cylinders of toxic gases in the open air before removal to a laboratory
- Never lay acetylene cylinders flat

Oxygen: grease must not be used on fittings or allowed to contaminate them as oxidation and spontaneous ignition may occur

Hydrogen: Extreme care should be taken when using hydrogen at a concentration of greater than 4% by volume in air forms an explosive mixture.

### **14.2 Flammable liquids**

The quantity of any highly flammable liquid stored should be kept to a minimum. Any such liquid not required for use should be stored safely. Unnecessary transport of highly flammable liquids should be avoided.

Large quantities of highly flammable liquids should not be stored in laboratories, but in suitable closed

containers in a purpose-built storeroom of fire resisting construction. Small quantities of highly flammable liquids may be stored in suitable closed containers kept in a cupboard in the laboratory.

Highly flammable liquids should always be handled in a fume cabinet.

Do not leave containers of flammable solvents on bench tops, open shelves or fume cupboards – always safely store them. When using such solvents, make sure that all flames are extinguished and display a warning notice.

### 14.3 Incompatible chemicals

Take care when mixing chemicals, as many chemicals are highly reactive. This is also important to remember when disposing of unwanted chemicals.

**FULL DETAILS CONCERNING INCOMPATIBILITY IS USUALLY ON THE SDS OF A PARTICULAR CHEMICAL. ALSO SEE THE SAFETY INDUCTION DOCUMENT (ON CLICKUP).**

Ensure that a good quality fume cupboard is used when working with chemicals which have fumes heavier than air. These fumes may accumulate in a ventilation system where extraction is incomplete.

### 14.4 Chemical contamination and spillage

***Regard all chemicals as poisonous*** (but also don't fear them – they only harm when used incorrectly)

Wear protective clothing and appropriate footwear. Before using any chemical determine what kind of first aid treatment would have to be administered in the event of an accident. Certain chemicals require specific antidotes which should be clearly labelled and easily accessible. A second person should always be present at a safe distance when work using poisonous substances is being carried.

### 14.5 Inherent Safety

Where possible, persons should first identify, eliminate or reduce hazards by inherently safer design. **THIS IS THE KEY PHILOSOPHY CONCERNING SAFETY IN OUR DEPARTMENT.** Inherently safer methods can fundamentally affect the process. It will be easier to use such methods if one considers them in the early stages of process development.

### 14.6 Incorrect handling procedures

- Never touch a chemical with bare hands
- Do not pour hot solutions into reagent bottles
- Always use funnels or glass rods when pouring concentrated acids or alkalis
- Funnels should not be too small for the work being carried out
- Never pour water onto acid
- Suitable precautions must be taken when opening bottles
- Take care which direction the opening of a container is facing when there might be a violent

reaction

- Any procedure involving toxic gases and vapours must be carried out in a suitable fume cupboard
- Use mechanical pipettes AND NOT mouth pipettes
- Do not smell chemicals to aid identification. Apart from an immediate reaction e.g. from ammonia, the long term consequences can be far more severe.
- Use the correct procedure for the disposal of chemical waste
- Ensure that there is not possible exothermicity that is not under control: e.g. when sulphuric acid is added to water, it reacts exothermically and produces heat, which can lead to glass beakers cracking, if the heat is not correctly distributed by stirring the mixture, slowly and adding only small amounts of acid at a time.

#### **14.7 Process Control**

Process control includes the use of sensors, alarms, trips and other control systems that either take automatic action or are manual intervention to prevent the conditions for uncontrolled reactions occurring. Specifying such measures requires a thorough understanding of the chemical process involved, especially the limits of the safe operation.

#### **14.8 Protective Measures**

Protective measures do not prevent a runaway but reduce the consequences should one occur. They are rarely used on their own as some preventative measures are required to reduce the demand for them. As they operate once a runaway has started, detailed knowledge of the reaction under runaway conditions are needed for their effective specification.

#### **14.9 Dangerous Chemicals that are often used**

Be aware of experiments where Hydrofluoric (HF) acid for which a special calcium-gluconate gel antidote is required in case of spills/contamination. While for cyanide, Tripac-Cyano is the antidote that should accompany the patient to the hospital. Both these antidotes are stored in the refrigerator that is located in room 4-5 (in addition oxygen bottle for first aid is on level 4, across from gate 4-11) – these chemicals are very dangerous and often a student underestimates them.

### **16. Laboratory Rules and Practice in a Nutshell**

#### **Read before entering the Labs: SAFETY IN THE LABORATORIES (LEARN OFF BY HEART!)**











































1. A safety test written each year allows individuals to enter laboratories.
2. Eating or drinking in the lab is not permitted (it is an offence in terms of the OHS act).
3. A risk assessment is required to do any laboratory work.









4. Make sure your risk assessments & SDS documents are always available for inspection.
5. Always wear relevant personal protective equipment (PPE) when working.
6. Always wear closed shoes in all laboratories – without feet, no work can be productive.
7. A clean workspace creates a safer workplace – keep your lab clean, it is after all the space in which you create your work which you are proud of.
8. An unattended setup is a danger – monitor your experiment at all times.
9. Working alone is dangerous (especially for you) and not allowed for most risk categories.
10. Please make sure that you are declared competent to work with equipment and chemicals (always ask the safety representative before commencing work).
11. Report all accidents/potential dangers, near misses and potential chemical exposures immediately.

**WHEN IN DOUBT ASK YOUR SAFETY REPRESENTATIVE!**

**FOR SAFETY IS NOT A GADGET BUT A STATE OF MIND ~ELEANOR EVERET**

## Appendix I: Control of Substance Hazardous to health (COSHH)

Reference number		Location																
Name of Substance <i>(Please Attach SDS)</i>		Manufacturer of substance																
Physical Form		Assessor and Date																
Description of activity																		
Person at risk:    Lecturers <input type="checkbox"/> Students <input type="checkbox"/> Cleaners <input type="checkbox"/> Contractors <input type="checkbox"/> Others <input type="checkbox"/>																		
<b>HAZARDS CLASSIFICATION</b>																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;"> Very Toxic <input style="width: 40px;" type="checkbox"/></td> <td style="width: 33%; text-align: center;"> Irritant <input style="width: 40px;" type="checkbox"/></td> <td style="width: 33%; text-align: center;"> Highly Flammable <input style="width: 40px;" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"> Toxic <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Sensitising <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Extremely Flammable <input style="width: 40px;" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"> Corrosive <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Biological <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Serious long term health hazard <input style="width: 40px;" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"> Harmful <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Oxidising <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Dangerous to the environment <input style="width: 40px;" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"> Explosive <input style="width: 40px;" type="checkbox"/></td> <td style="text-align: center;"> Flammable <input style="width: 40px;" type="checkbox"/></td> <td></td> </tr> </table>				 Very Toxic <input style="width: 40px;" type="checkbox"/>	 Irritant <input style="width: 40px;" type="checkbox"/>	 Highly Flammable <input style="width: 40px;" type="checkbox"/>	 Toxic <input style="width: 40px;" type="checkbox"/>	 Sensitising <input style="width: 40px;" type="checkbox"/>	 Extremely Flammable <input style="width: 40px;" type="checkbox"/>	 Corrosive <input style="width: 40px;" type="checkbox"/>	 Biological <input style="width: 40px;" type="checkbox"/>	 Serious long term health hazard <input style="width: 40px;" type="checkbox"/>	 Harmful <input style="width: 40px;" type="checkbox"/>	 Oxidising <input style="width: 40px;" type="checkbox"/>	 Dangerous to the environment <input style="width: 40px;" type="checkbox"/>	 Explosive <input style="width: 40px;" type="checkbox"/>	 Flammable <input style="width: 40px;" type="checkbox"/>	
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 Explosive <input style="width: 40px;" type="checkbox"/>	 Flammable <input style="width: 40px;" type="checkbox"/>																	
Hazard type: <input type="checkbox"/> Gas <input type="checkbox"/> Vapour <input type="checkbox"/> Fume <input type="checkbox"/> Dust <input type="checkbox"/> Liquid <input type="checkbox"/> Solid <input type="checkbox"/> Other (State) _____																		
Route of exposure: <input type="checkbox"/> Inhalation <input type="checkbox"/> Skin <input type="checkbox"/> Eyes <input type="checkbox"/> Ingestion <input type="checkbox"/> Other (State) _____																		
<b>WORKPLACE EXPOSURE LIMIT</b>																		
Long term exposure level (8hr) <input style="width: 40px;" type="checkbox"/>		Short exposure level (15mins) <input style="width: 40px;" type="checkbox"/>																
<b>STATE THE RISK TO HEALTH FROM IDENTIFIED HAZARDS</b>																		
<b>CONTROL MEASURES</b>																		

<b>PPE REQUIRED WHEN USING THE SUBSTANCE</b>			
 <input style="width: 30px; height: 20px;" type="checkbox"/>		 <input style="width: 30px; height: 20px;" type="checkbox"/>	
Dust mask		Visor	
 <input style="width: 30px; height: 20px;" type="checkbox"/>		 <input style="width: 30px; height: 20px;" type="checkbox"/>	
Respirator		Goggles	
 <input style="width: 30px; height: 20px;" type="checkbox"/>		 <input style="width: 30px; height: 20px;" type="checkbox"/>	
Gloves		Overalls	
 <input style="width: 30px; height: 20px;" type="checkbox"/>		 <input style="width: 30px; height: 20px;" type="checkbox"/>	
Footwear		Other	
<b>FIRST AID MEASURES</b>			
<b>STORAGE</b>			
<b>DISPOSAL OF SUBSTANCES</b>			
Hazardous Waste		Return to supplier	
		Other (State)	
Is exposure adequately controlled?		YES	NO
Risk rating after control measure		HIGH	MEDIUM      LOW

## APPENDIX II

### BASELINE RISK ASSESSMENT: Project ABC/ Equipment ABC

**Supervisor:**

**Student:** \_\_\_\_\_

[illegible]

**Risk Matrix:**

Loss Type		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
(S/H) Harm to People (Safety / Health)		Slight injury or health effects - first aid / minor medical treatment level	Minor injury or health effects - restricted work or minor lost workday case	Major injury or health effects - major lost workday case / permanent disability	Permanent total disabilities, single fatality	Multiple fatalities
(EI) Environmental Impact		Minimal environmental harm	Material environmental harm	Serious environmental harm	Major environmental harm	Extreme environmental harm
(AD) Business Disruption / Asset Damage & Other Consequential Losses			Brief disruption to operation / R50k to less than R500k	Partial shutdown / R500k to less than R1M	Partial loss of operation /R1M to less than R5M	Substantial or total loss of operation / R5m and higher
(L&R) Legal & Regulatory		Low level legal issue	Minor legal issue; non-compliance and breaches of the law	Serious breach of law; investigation/report to authority, prosecution and/or moderate penalty possible	Major breach of the law; considerable prosecution and penalties	Very considerable penalties & prosecutions. Multiple law suits & jail terms
(R) Impact on Reputation/Social/Community		Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern	National impact - national public concern	International impact - international public attention
Likelihood	Likelihood Examples (use as guide only)	Risk Rating				
5 Almost Certain	The unwanted event has occurred frequently; occurs in order of one or more times in 6 months & is likely to reoccur within 6 months	11 (M)	16 (H)	20 (H)	23 (Ex)	25 (Ex)
4 Likely	The unwanted event has occurred infrequently; occurs in order of less than once in 6 months & is likely to re-occur within 1 year	7 (M)	12 (M)	17 (H)	21 (Ex)	24 (Ex)
3 Possible	The unwanted event could well have occur in the business at some point within 2 years	4 (L)	8 (M)	13 (H)	18 (H)	22 (Ex)
2 Unlikely	The unwanted event has happened in the business at some time; or could happen within 3 years	2 (L)	5 (L)	9 (M)	14 (H)	19 (H)
1 Most Unlikely	The unwanted event has never been known to occur in the business; or is highly unlikely that it could ever occur beyond 3 years	1 (L)	3 (L)	6 (M)	10 (M)	15 (H)
Risk Rating	Risk Level	Guidelines for Risk Matrix				
21 to 25	(Ex) – Extreme (AA)	Eliminate, avoid, implement specific action plans / procedures to manage & monitor				
13 to 20	(H) – High (A)	Proactively manage via appropriate management system				
6 to 12	(M) – Medium (B)	Actively manage via appropriate management system				
1 to 5	(L) – Low (C)	Monitor & manage as appropriate via management system				



# Using The Correct Fire Extinguisher



**Water**

**For use on**

-  **CLASS A** Wood, Paper, Textiles etc
-  **Do not use on**
-  **CLASS B** Flammable liquid
-  **Live electrical equipment**



**Dry Powder**

**For use on**

-  **CLASS A** Wood, Paper, Textiles etc
-  **CLASS B** Flammable liquids
-  **CLASS C** Gaseous fires
-  **Live electrical equipment**



**Foam**

**For use on**

-  **CLASS A** Wood, Paper, Textiles etc
-  **CLASS B** Flammable liquids
-  **Do not use on**
-  **Live electrical equipment**



**CO2**

**For use on**

-  **CLASS B** Flammable liquids
-  **Live electrical equipment**
-  **Do not use on**
-  **CLASS A** Wood, paper and textiles
-  **CLASS D** Flammable metal fires
- Do not use in a confined space**



**Wet Chemical**

**For use on**

-  **CLASS F** Cooking oil fires
-  **CLASS A** Wood, Paper, Textiles etc.
- Discharge entire contents on to fire from at least 1 metre distance**



## ACCIDENT / INCIDENT / NEAR-MISS PRELIMINARY REPORT FORM

**PLEASE NOTE:** Return this form to the Safety Coordinators at the OHS-Division within 24 hours of accident / incident / near-miss occurrence:

Carol Mbele: [carol.mbele@up.ac.za](mailto:carol.mbele@up.ac.za)

Bobby Hand: [bobby.hand@up.ac.za](mailto:bobby.hand@up.ac.za)

Sonja Sauer: [sonja.sauer@up.ac.za](mailto:sonja.sauer@up.ac.za)

1. Date of incident: ..... Time: .....
2. Who was the injured person?  
(Circle one – WCL2 document must also be completed for UP employees):  

<input type="checkbox"/> UP- Employee	<input type="checkbox"/> UP- Student
<input type="checkbox"/> UP- Contractor	<input type="checkbox"/> UP-Visitor
3. Full name of injured person / affected person: .....
4. Personnel / Student number: .....
5. ID number: .....
6. Full names of witnesses: .....
7. Address of injured / affected person: .....  
.....
8. Phone number: .....
9. E-mail address: .....
10. Date of birth: .....
11. ☐ Male ☐ Female
12. Area where incident took place (e.g. Botany lab 2.2): .....
13. Type of injury (if applicable): .....
14. Details of accident / incident / near-miss: .....  
.....

.....  
**SIGNATURE OF INJURED/AFFECTED PERSON**

.....  
**DATE**

## SAFETY DATA SHEET

Creation Date 24-Apr-2009

Revision Date 18-Jan-2018

Revision Number 8

### 1. Identification

**Product Name** Molecular Biology Grade Ethanol

**Cat No. :** BP2818-4, BP2818-100, BP2818-500

**CAS-No** 64-17-5  
**Synonyms** Ethyl alcohol; Absolute ethanol

**Recommended Use** Laboratory chemicals.  
**Uses advised against** Not for food, drug, pesticide or biocidal product use

#### Details of the supplier of the safety data sheet

##### Company

Fisher Scientific  
One Reagent Lane  
Fair Lawn, NJ 07410  
Tel: (201) 796-7100

##### **Emergency Telephone Number**

CHEMTREC®, Inside the USA: 800-424-9300  
CHEMTREC®, Outside the USA: 001-703-527-3887

### 2. Hazard(s) identification

#### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Serious Eye Damage/Eye Irritation	Category 2

#### Label Elements

##### **Signal Word**

Danger

##### **Hazard Statements**

Highly flammable liquid and vapor  
Causes serious eye irritation



##### **Precautionary Statements**

**Prevention**

Obtain special instructions before use  
Do not handle until all safety precautions have been read and understood  
Use personal protective equipment as required  
Wash face, hands and any exposed skin thoroughly after handling  
Wear eye/face protection  
Do not breathe dust/fume/gas/mist/vapors/spray  
Use only outdoors or in a well-ventilated area  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
Keep container tightly closed  
Ground/bond container and receiving equipment  
Use explosion-proof electrical/ventilating/lighting/equipment  
Use only non-sparking tools  
Take precautionary measures against static discharge  
Keep cool

**Response**

IF exposed or concerned: Get medical attention/advice

**Inhalation**

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

**Skin**

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

**Eyes**

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

**Fire**

In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction

**Storage**

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

**Disposal**

Dispose of contents/container to an approved waste disposal plant

**Hazards not otherwise classified (HNOC)**

None identified

### 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Ethyl alcohol	64-17-5	99-100

### 4. First-aid measures

<b>General Advice</b>	If symptoms persist, call a physician.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
<b>Inhalation</b>	Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
<b>Ingestion</b>	Clean mouth with water and drink afterwards plenty of water.
<b>Most important symptoms and effects</b>	Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
<b>Notes to Physician</b>	Treat symptomatically

## 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
<b>Unsuitable Extinguishing Media</b>	Water may be ineffective, Do not use a solid water stream as it may scatter and spread fire
<b>Flash Point</b>	13 °C / 55.4 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	363 °C / 685.4 °F
<b>Explosion Limits</b>	
<b>Upper</b>	19 vol %
<b>Lower</b>	3.3 vol %
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

### Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

### Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO<sub>2</sub>)

### Protective Equipment and Precautions for Firefighters

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

### NFPA

<b>Health</b>	<b>Flammability</b>	<b>Instability</b>	<b>Physical hazards</b>
2	3	1	N/A

## 6. Accidental release measures

<b>Personal Precautions</b>	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
<b>Environmental Precautions</b>	Should not be released into the environment. Do not flush into surface water or sanitary sewer system.
<b>Methods for Containment and Clean Up</b>	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

## 7. Handling and storage

<b>Handling</b>	Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.
<b>Storage</b>	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition. Flammables area. Keep away from heat and sources of ignition.

## 8. Exposure controls / personal protection

### Exposure Guidelines



Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Ethyl alcohol	STEL: 1000 ppm	(Vacated) TWA: 1000 ppm (Vacated) TWA: 1900 mg/m <sup>3</sup> TWA: 1000 ppm TWA: 1900 mg/m <sup>3</sup>	IDLH: 3300 ppm TWA: 1000 ppm TWA: 1900 mg/m <sup>3</sup>	TWA: 1000 ppm TWA: 1900 mg/m <sup>3</sup>

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

**Engineering Measures**

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

**Personal Protective Equipment****Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection**

Long sleeved clothing.

**Respiratory Protection**

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear, Colorless
Odor	Alcohol
Odor Threshold	No information available
pH	7 @ 20°C 10g/l aq.sol
Melting Point/Range	-114 °C / -173.2 °F
Boiling Point/Range	78 °C / 172.4 °F
Flash Point	13 °C / 55.4 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	19 vol %
Lower	3.3 vol %
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	0.785 g/cm <sup>3</sup> @20°C
Solubility	miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	363 °C / 685.4 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C <sub>2</sub> H <sub>6</sub> O
Molecular Weight	46.07
VOC Content(%)	100% (Organic Carbon (by mass) = 52.1 %) (EC/1999/13)

## 10. Stability and reactivity

**Reactive Hazard**

None known, based on information available

<b>Stability</b>	Hygroscopic.
<b>Conditions to Avoid</b>	Incompatible products. Heat, flames and sparks. Keep away from open flames, hot surfaces and sources of ignition.
<b>Incompatible Materials</b>	Strong oxidizing agents, Strong acids, Acid anhydrides, Acid chlorides
<b>Hazardous Decomposition Products</b>	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> )
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information

#### Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethyl alcohol	3450 mg/kg ( Mouse )	Not listed	20000 ppm/10H ( Rat )

**Toxicologically Synergistic** No information available

#### Products

#### Delayed and immediate effects as well as chronic effects from short and long-term exposure

<b>Irritation</b>	Irritating to eyes
<b>Sensitization</b>	No information available
<b>Carcinogenicity</b>	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Ethyl alcohol	64-17-5	Group 1	Known	A3	X	Not listed

*IARC: (International Agency for Research on Cancer)*

*IARC: (International Agency for Research on Cancer)*

*Group 1 - Carcinogenic to Humans*

*Group 2A - Probably Carcinogenic to Humans*

*Group 2B - Possibly Carcinogenic to Humans*

*NTP: (National Toxicity Program)*

*NTP: (National Toxicity Program)*

*Known - Known Carcinogen*

*Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

*A1 - Known Human Carcinogen*

*A2 - Suspected Human Carcinogen*

*A3 - Animal Carcinogen*

*OSHA: (Occupational Safety & Health Administration)*

*ACGIH: (American Conference of Governmental Industrial Hygienists)*

*OSHA: (Occupational Safety & Health Administration)*

*X - Present*

*Mexico - Occupational Exposure Limits - Carcinogens*

*Mexico - Occupational Exposure Limits - Carcinogens*

*A1 - Confirmed Human Carcinogen*

*A2 - Suspected Human Carcinogen*

*A3 - Confirmed Animal Carcinogen*

*A4 - Not Classifiable as a Human Carcinogen*

*A5 - Not Suspected as a Human Carcinogen*

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

**Developmental Effects** No information available.

**Teratogenicity** No information available.

**STOT - single exposure** None known

**STOT - repeated exposure** None known

**Aspiration hazard** No information available

**Symptoms / effects, both acute and delayed** Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

**Endocrine Disruptor Information** No information available

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information

### Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethyl alcohol	EC50 (72h) = 275 mg/l (Chlorella vulgaris)	Fathead minnow (Pimephales promelas) LC50 = 14200 mg/l/96h	Photobacterium phosphoreum: EC50 = 34634 mg/L/30 min Photobacterium phosphoreum: EC50 = 35470 mg/L/5 min	EC50 = 9268 mg/L/48h EC50 = 10800 mg/L/24h

**Persistence and Degradability** Persistence is unlikely based on information available.

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Will likely be mobile in the environment due to its volatility.

Component	log Pow
Ethyl alcohol	-0.32

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## 14. Transport information

### DOT

UN-No UN1170  
 Proper Shipping Name ETHANOL  
 Hazard Class 3  
 Packing Group II

### TDG

UN-No UN1170  
 Proper Shipping Name ETHANOL  
 Hazard Class 3  
 Packing Group II

### IATA

UN-No UN1170  
 Proper Shipping Name ETHANOL  
 Hazard Class 3  
 Packing Group II

### IMDG/IMO

UN-No UN1170  
 Proper Shipping Name ETHANOL  
 Hazard Class 3  
 Packing Group II

## 15. Regulatory information



All of the components in the product are on the following Inventory lists: X = listed

#### International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Ethyl alcohol	X	X	-	200-578-6	-		X	X	X	X	X

#### Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

#### U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration  
Not applicable

CERCLA Not applicable

California Proposition 65 This product contains the following proposition 65 chemicals Ethyl alcohol is only a considered a Proposition 65 developmental hazard when it is ingested as an alcoholic beverage

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Ethyl alcohol	64-17-5	Development (alcoholic beverages only)	-	Developmental Carcinogen

#### U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethyl alcohol	X	X	X	X	X

#### U.S. Department of Transportation

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

#### U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

#### Other International Regulations

Mexico - Grade

Serious risk, Grade 3

**16. Other information****Prepared By**

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24-Apr-2009

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18-Jan-2018

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**Revision Summary**

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). SDS sections updated. 2.

**Disclaimer**

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

**End of SDS**

# Material Safety Data Sheet

## HYDROFLUORIC ACID

Print Date: September 2011

### SECTION 1 – Chemical Product and Company Identification

MSDS Name: HYDROFLUORIC ACID

MSDS Preparation Date: 09-2011, Supersedes 07-2008, 02-2007, 02-2004, 02-2001 & 02-98

Synonyms: Fluohydric acid, fluoric acid, hydrofluoric acid solution.

Chemical Names: DE Fluorwasserstoffsäure; ES Fluoruro de hidrógeno; FR Acide fluorhydrique; IT Acido fluoridrico; NL Fluorwaterstofzuur.

UN / NA Number(s): UN1790

Formula: HF

Molecular Wt: 20.01

Product Numbers: S010501, S020502, S010501-SSND13, S010501-SSNW03, S010501-SSNW04, S010501-SSNW61, S010501-SSNX43, S020502-SSNF07, S020502-SSNF08, S020502-SSNP01, S020502-SSNP02, S020502-SSNP03, S020502-SSNP04, S020502-SSNP05, S020502-SSNP06, S040501-SSND12, S040501-SSND13, S040501-SSND14

Supplier: Seastar Chemicals Inc, 10005 McDonald Park Road, Sidney, BC V8L 5Y2 CANADA

Tel: (250) 655-5880, Fax: (250) 655-5888

CANUTEC (CAN): (613)-996-6666

### SECTION 2 – Composition/Information on Ingredients

<i>Chemical Name</i>	<i>Percent</i>	<i>CAS #</i>	<i>EINECS/ELINCS</i>
Hydrofluoric acid	47-51%	7664-39-3	231-634-8
Water	Balance	7732-18-5	231-791-2

### SECTION 3 – Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** Colourless liquid with a pungent, irritating, penetrating odour. Concentrations above 40% fume in air. Will not burn. Cylinders or tanks may rupture and explode if heated. Highly reactive. Contact with metals, such as iron or steel, slowly releases flammable and potentially explosive hydrogen gas. VERY TOXIC. May be fatal if inhaled, absorbed through the skin or swallowed. CORROSIVE to the nose, throat and respiratory tract. Causes lung injury-effects may be delayed. CORROSIVE to the eyes and skin. Causes severe burns. May cause blindness and permanent scarring. Absorbed fluoride can cause metabolic imbalances with irregular heartbeat, nausea, dizziness, vomiting and seizures. Long-term exposure may cause skeletal fluorosis (weakened bone structure).

**Target Organs:** Lungs, teeth, eyes, skin, bone, mucous membranes.

#### Potential Health Effects

**Primary Route(s) of Entry:** Inhalation and ingestion. Skin contact. Eye contact. Skin absorption.

**Effects of Acute Exposure:** May be fatal by ingestion, inhalation or skin absorption. Corrosive. Acute effects may be delayed.

**LD50/LC50:** CAS# 7732-18-3: Oral, rat: LD50 = >90 mL/kg. CAS# 7664-39-3: Inhalation, mouse: LC50 = 342 ppm/1H. Inhalation, rat: LC50 = 1276 ppm/1H.

**Eyes:** Direct contact with hydrofluoric acid can cause severe and irreversible corrosive injury with possible corneal scarring and blindness. The acid penetrates to deep tissue layers and causes severe corrosive injury. The gas can dissolve in the moisture on the surface, forming corrosive hydrofluoric acid. Irritation has been reported with exposure to concentrations as low as 0.24 ppm for 1 hour.

**Skin:** May be fatal if absorbed through skin and penetration may continue for several days. Hydrofluoric acid is extremely corrosive and can cause very deep and excruciatingly painful burns and tissue loss. Burns from concentrated solutions (greater than 50%) are felt immediately and tissue destruction is readily apparent. Weaker solutions (20-50%) result in burns that are apparent after several hours. Burns from solutions of less than 20% may take up to 24 hours to become apparent. Weak solutions (less than 7%) penetrate deeply before causing tissue damage and surface involvement may be minimal. Burns are swollen, hot and painful, then develop white or yellowish areas and blistering, with deep ulceration and destruction of tissue, which tends to heal slowly. The severity of the burns and absorption of the acid (with liquefaction necrosis of soft tissue and decalcification and corrosion of the bone) have resulted in permanent scarring, disability and death.

**Ingestion:** May be fatal if swallowed. Hydrofluoric acid is corrosive and can cause severe burning of the mouth, throat and stomach. Perforation of the digestive system may occur. Systemic fluoride toxicity has occurred following ingestion. Symptoms such as nausea, vomiting, abdominal pain, reduced heartbeat and blood pressure, shortness of breath have been reported. In some cases, death occurred in less than one hour following ingestion. Ingestion is not a typical route of occupational exposure.

**Inhalation:** May be fatal if inhaled. Low concentrations (a few ppm) can cause irritation of the nose, throat, eyes and respiratory tract. Higher concentrations can cause severe burns to the throat, airways and lungs. Fluid accumulation in the lungs and irregular heartbeat has led to deaths within hours following inhalation and, in some cases, concurrent skin contact with unknown concentrations of HF.

Within 24-48 hours, the victim may experience a rapidly worsening difficulty in breathing, accompanied by coughing. These symptoms are due to the development of a life-threatening accumulation of fluid in the lungs (pulmonary edema). Severe short-term exposures may result in long-lasting effects such as shortness of breath and pulmonary emphysema (larger than normal air spaces in the lungs which decrease lung efficiency).

**Effects of Chronic Exposure:** Absorbed fluoride can cause metabolic imbalances with irregular heartbeat, central nervous system depression, seizures, and deaths. Long-term exposure may cause osteofluorosis (weakened bone structure), skin disorders, and respiratory, liver and kidney effects. To the best of our knowledge, the chronic toxicity of this substance has not been fully investigated.

## SECTION 4 – First Aid Measures

**FIRST AID PROCEDURES SHOULD BE ESTABLISHED PRIOR TO USE. DO NOT HANDLE UNTIL ALL SAFETY PRECAUTIONS HAVE BEEN READ AND UNDERSTOOD. SEEK MEDICAL ATTENTION FOR ALL EXPOSURES.**

**Eyes:** Avoid direct contact. Wear chemical protective gloves if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Take care not to rinse contaminated water into the unaffected eye. DO NOT use benzalkonium chloride (Zephiran®) for eye contact. If sterile 1% calcium gluconate is available, limit water flushing to 5 minutes. Then, use the 1% calcium gluconate solution to repeatedly rinse the eye(s). Immediately transport victim to an emergency care facility. Continue flushing with water, neutral saline or 1% calcium gluconate during transport, if at all possible.

**Skin:** Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately flush with lukewarm, gently flowing water. Limit flushing with water to 5 minutes if 0.13% benzalkonium chloride (Zephiran®) solution or 2.5% calcium gluconate gel is available. If these treatments are not available, continue flushing until medical treatment is available. A certain quantity of either prepared solution or the calcium gluconate gel be kept on hand at all times. Solutions should be replaced annually if not previously used.

**BENZALKONIUM CHLORIDE:** Begin soaking the affected area in iced 0.13% benzalkonium chloride (Zephiran®) solution. Use ice cubes, not shaved ice, to prevent frostbite. If immersion is not practical, towels should be soaked with iced 0.13% benzalkonium chloride (Zephiran®) solutions and used as compresses for the burned area. Compresses should be changed every 2-4 minutes. Benzalkonium chloride (Zephiran®) soaks or compresses should be continued until medical attention is available.

**CALCIUM GLUCONATE GEL:** Wearing chemical protective gloves, start massaging 2.5% calcium gluconate gel into the burn site. Apply gel frequently and massage continuously until medical attention is available. Quickly transport victim to an emergency care facility. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal.

**Ingestion:** NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or is convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

**Inhalation:** Remove source of contamination or move victim to fresh air. If breathing is difficult, trained personnel should administer oxygen and 2.5% calcium gluconate, preferably with a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED) immediately. Quickly transport victim to an emergency care facility.

**Notes to Physician:** Due to delayed and persistent symptoms, observe patient closely for 48 hours. Prompt action is essential in all cases of contact and first aid procedures must be followed if any contact is suspected. Consult a doctor and/or the nearest Poison Control Centre for ALL EXPOSURES. Some first aid procedures recommended above require advanced first aid training. Protocols for undertaking advanced procedures must be developed in consultation with a doctor and routinely reviewed. All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.

**Antidote:** Always have calcium gluconate gel on hand. The use of infiltration therapy and intraarterial therapy for hydrofluoric acid burns resulting from concentrations greater than 20% should be made by qualified medical personnel. Calcium gluconate may be administered intravenously slowly to bind to the fluoride ion. This administration needs to be monitored under the supervision of a physician.

## SECTION 5 – Fire Fighting Measures

**General Information:** Hydrofluoric acid is not flammable. However, if it is involved in a fire, extremely corrosive and very toxic hydrogen fluoride gas or fumes may be released into the air. Contact with metals, such as iron or steel, slowly releases extremely flammable and potentially explosive hydrogen gas. A large amount of heat is generated when highly concentrated hydrofluoric acid solutions are diluted with water. Closed containers may rupture violently and suddenly release large amounts of product when exposed to fire or excessive heat for a sufficient period of time. Firefighters should wear a positive pressure self-contained respirator (SCBA) and full-body encapsulating chemical protective suit.

**Extinguishing Media:** Use extinguishing agents compatible with acid and appropriate for fire surrounding hydrofluoric acid containers. The extinguishing medium used depends on the concentration of the acid. Water spray or fog may be used where concentrations below 60% are present. Higher concentrations may react violently with water and a dry agent, e.g. dry chemical powder is recommended. Use water spray to keep fire exposed containers cool.

**Auto-ignition Temperature:** Not available.

**Flash Point:** Not available.

**NFPA Rating:** Health 4; Flammability 0; Reactivity 1.

**Explosion Limits:** Lower: Not available. Upper: Not available.

## SECTION 6 – Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8. Restrict access to area until completion of clean-up. Remove or isolate flammable and combustible materials. Ensure clean-up is conducted by trained personnel only.

**Spills/Leaks:** Absolutely no unprotected contact with spilled material. Stop leak if without risk. Keep materials which can burn away from spilled material. Use water spray to knock down gas. Do not get water inside vessels. Dike corrosive water solutions to prevent entry into waterways, sewers or confined spaces.

**Steps to be taken in case material is released or spilled:** Contain spill with absorbent material which does not react with spilled material and cautiously dilute with large excess of water. Neutralize carefully with soda ash or lime. Material will fume during neutralization; approach from upwind. Provide good ventilation. Contaminated absorbent material will pose the same hazards as the spilled product. **LARGE SPILLS:** Evacuate area. Contact fire and emergency services and supplier for advice.

**Waste disposal method:** According to all applicable regulations. Avoid runoff.

## SECTION 7 – Handling and Storage

**Handling:** This material is a VERY TOXIC (INHALATION and SKIN CONTACT HAZARD), CORROSIVE liquid. Never work alone with this chemical. Another person should be in view at all times and be equipped and trained to rescue. In case of leaks or spills, escape-type respiratory protective equipment should be available in the work area. If hydrofluoric acid is released, immediately evacuate the area.

Ensure that emergency eyewash and showers are in the immediate vicinity of work involving hydrofluoric acid. Prior to working with hydrofluoric acid, ensure that appropriate first aid procedures are established and supplies are readily accessible to trained personnel. Be aware of typical signs and symptoms of poisoning and first aid procedures. Any signs of illness should be reported immediately to supervisory personnel. Seek medical attention for all exposures even if an exposure did not seem excessive. Symptoms of a severe exposure can be delayed.

Closed handling systems should be used. Avoid generating vapours or mists. Prevent the release of vapours/mist into workplace air. Keep away from combustible materials. Protect from accidental contact with water. Do not use with incompatible materials. See Section 10 for more information. Keep containers tightly closed when not in use. Never return contaminated material to its original container. Never add water to a corrosive. Always add corrosives to COLD water. When mixing with water, cautiously and slowly stir small amounts of acid into water. Assume that empty containers contain residues which are hazardous.

**Storage:** Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in metal or glass containers. Do not store in direct sunlight. Keep tightly closed. Empty container may contain hazardous residue. Do not add any other material to the container. Do not wash down the drain. Do not get in eyes, on skin, or on clothing. Wash well after use. Handle in accordance with good storage and handling practices. Do not allow smoking or food consumption while handling. Store in approved containers only.

**Storage Code:** White.

## SECTION 8 – Exposure Control/Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

**Exposure Limits:**

<i>Chemical Name</i>	<i>ACGIH</i>	<i>NIOSH</i>	<i>OSHA</i>
Hydrofluoric acid	As F, skin: 0.5 ppm TWA; 2 ppm Ceiling	As F: 3 ppm TWA (2.5 mg/m <sup>3</sup> TWA); 6 ppm STEL (5 mg/m <sup>3</sup> STEL); 30 ppm IDLH	3 ppm TWA
Water	None listed.	None listed.	None listed.

OSHA Vacated PELs Hydrofluoric acid, as F: 3 ppm TWA

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133. Wear face shield.

**Skin:** Wear appropriate protective neoprene gloves to prevent skin exposure. Wear acid-resistant jacket, trousers and boots sufficient to protect skin.  
**Clothing:** Wear appropriate protective clothing to prevent skin exposure.  
**Respiratory Protection:** Wear appropriate OSHA/MSHA approved chemical cartridge respirator regulations found in 29CFR 1910.134. If more than TLV, do not breathe vapour. Wear self-contained breathing apparatus. Always use an NIOSH-approved respirator when necessary.  
**Ventilation:** Use only in a chemical fume hood. Adequate ventilation to maintain vapour/dust below TLV.  
**Other Protective Equipment:** Make eye bath and emergency shower available.

## SECTION 9 – Physical and Chemical Properties

**Physical State:** Liquid  
**Appearance:** Clear, colourless  
**Odour:** Strong odour  
**pH:** Weak acid  
**Vapour Pressure:** Varies with concentration; 50% (w/w): 1.64 kPa (12.4 mm Hg) at 20 °C (calculated).  
**Vapour Density:** 1.86 at 25 °C (air = 1) (HF gas)  
**Evaporation Rate:** Varies with concentration  
**Viscosity:** No information available.

**Boiling Point:** Varies with concentration; 48% (w/w): 108.7 °C (227.7 °F); 38.2% (w/w): 112.2 °C (234 °F)  
**Freezing/Melting Point:** Varies with concentration; 48% (w/w): -37 °C (-34.6 °F)  
**Decomposition Temperature:** No information available.  
**Solubility:** Soluble in water in all proportions. Soluble in ethanol; slightly soluble in diethyl ether, benzene, toluene, xylene and tetralin.  
**Specific Gravity/Density:** 50% (w/w): 1.18 at 20 °C (water = 1).  
**Molecular Formula:** HF  
**Molecular Weight:** 20.0054

## SECTION 10 – Stability and Reactivity

**Chemical Stability:** Normally stable.  
**Conditions to Avoid:** Incompatible materials, metals, high temperatures.  
**Incompatibilities with Other Materials:** Substance is incompatible with over 35 specific chemicals. Please refer to the NFPA Fire Protection Guide for specifics. Heat. Glass, concrete and other silicon-bearing materials will yield silicon tetrafluoride. Pressure build-up from this process has been known to blow up glass containers. Carbonates, sulphides, and cyanides will yield toxic gases such as carbon dioxide, hydrogen sulphide and hydrogen cyanide. Alkalis, some oxides, fluorine and other water-reactive materials will cause strong exothermic reactions that can be violent. Reacts with most common metals to produce hydrogen. Corrosive to many materials, including leather, rubber and many organics.  
**Hazardous Decomposition Products:** Fluoride fumes.  
**Hazardous Polymerization:** Tends to associate by means of hydrogen bonds to form polymers in both liquid and gaseous states. This polymerization is not hazardous.

## SECTION 11 – Toxicological Information

**RTECS:** CAS# 7732-18-5: ZC0110000. CAS# 7664-39-3: MW7875000.  
**LD50/LC50:** CAS# 7732-18-3: Oral, rat: LD50 = >90 mL/kg. CAS# 7664-39-3: Inhalation, mouse: LC50 = 342 ppm/1H. Inhalation, rat: LC50 = 1276 ppm/1H.  
**Carcinogenicity:** CAS# 7732-18-5: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65. CAS# 7664-39-3: ACGIH: Not listed. California: Not listed. NIOSH: Not listed. NTP: Not listed. OSHA: Not listed. IARC: [present] (when used in drinking water) (listed as 'FLUORIDES, INORGANIC').

**Epidemiology:** Standard Draize test: Eye, human – 50 mg, severe reaction.  
**Teratogenicity:** Embryo or fetus: death, Inhalation-rat TCLO = 4980 µg/m<sup>3</sup>/4H (1-22 D preg).  
**Reproductive:** Fertility: post- and pre-implantation mortality, Inhalation-rat TCLO=470 µg/m<sup>3</sup>/4H.  
**Mutagenicity:** DNA Damage: *D. Melanogaster* – Inhalation 1300 ppb/6W. Sex Chromosome Loss/Non-disjunction: *D. Melanogaster* – Inhalation 2900 ppb.  
**Neurotoxicity:** No information available.

## SECTION 12 – Ecological Information

**Ecotoxicity:** Fish (fresh water) 60 ppm lethal (time period not specified).  
**Environmental:** No information reported.

**Physical:** No information available.  
**Other:** None.

## SECTION 13 – Disposal Considerations

Dispose of in a manner consistent with federal, provincial/state/territorial, and local regulations.  
**RCRA D-Maximum Concentration of Contaminants:** None of the components are on this list.  
**RCRA D Series – Chronic Toxicity Reference Levels:** None of the components are on this list.  
**RCRA F Series Wastes:** None of the components are on this list.

RCRA P Series Wastes: None of the components are on this list.

RCRA U Series Wastes: CAS# 7664-39-3: waste number U134 (Corrosive waste, Toxic waste).

RCRA Substances Banned from Land Disposal: CAS# 7664-39-3 is banned from land disposal according to RCRA.

## SECTION 14 – Transport Information

### CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG) SHIPPING INFORMATION

Shipping Name and Description: HYDROFLUORIC ACID, solution, with not more than 60 per cent hydrofluoric acid

UN Number: UN1790

Class: 8, 6.1

Packing Group/Category: II

Special Provisions: ---

Marine Pollutant: ---

Passenger Carrying Road/Railway Vehicle Index: 1 kg or L

NOTE: This information incorporates the Transportation of Dangerous Goods Regulations SOR/2001-286, effective October 14, 2009.

### US DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS MATERIALS SHIPPING INFORMATION (49 CFR)

Shipping Name and Description: HYDROFLUORIC ACID, with not more than 60 percent strength

Identification Number: UN1790

Hazard Class or Division: 8

Packing Group: II

NOTE: This information was taken from the US Code of Federal Regulations Title 49 - Transportation and is effective July 1, 2009.

### IATA (1 January – 31 December 2010)

UN/ID No. A	Proper Shipping Name / Description B	Class or Div. (Sub Risk) C	Hazard Label(s) D	PG E	Passenger and Cargo Aircraft		Cargo Aircraft Only		S.P. See 4.4 M
					Pkg Inst I	Max Net Qty/Pkg J	Pkg Inst K	Max/Net Qty/Pkg L	
1790	Hydrofluoric acid 60% or less strength	8 (6.1)	Corrosive & Toxic	II	809	1 L	813	30 L	

NOTE: Consult IATA DG Regulations for the most recent information, abbreviations and reference marks.

## SECTION 15 – Regulatory Information

### US OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200)

OSHA Hazard Communication Evaluation: Meets criteria for hazardous material, as defined by 29 CFR 1910.1200.

#### US Federal

TSCA: CAS# 7732-18-5 is listed on the TSCA Inventory. CAS# 7664-39-3 is listed on the TSCA Inventory.

Health and Safety Reporting List: None of the components are on this list.

Chemical Test Rules: None of the components are on this list.

TSCA Section 12b: None of the components are on this list.

TSCA Significant New Use Rule (SNUR): None of the components are on this list.

CERCLA Reportable Quantities (RQ): CAS# 7664-39-3: final RQ = 100 pounds (45.4 kg).

SARA Threshold Planning Quantities (TPQ): CAS# 7664-39-3: TPQ = 100 pounds.

SARA Hazard Categories: CAS# 7664-39-3: Acute, chronic.

SARA Section 313: This material contains Hydrofluoric acid (CAS# 7664-39-3, 48-50%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### US State

State Right to Know: Hydrofluoric acid can be found on the following state Right-to-Know lists: California, New Jersey (RTK# 3759), Florida, Pennsylvania, Minnesota, Massachusetts (10 lbs RQ).

Clean Air Act – Hazardous Air Pollutants (HAPs): CAS# 7664-39-3 is listed as a hazardous air pollutant (HAP).

Clean Air Act – Class 1 Ozone Depletors: None of the components are on this list.

Clean Air Act – Class 2 Ozone Depletors: None of the components are on this list.

Clean Water Act – Hazardous Substances: CAS# 7664-39-3 is listed as a Hazardous Substance under the CWA.

Clean Water Act – Priority Pollutants: None of the components are on this list.

Clean Water Act – Toxic Pollutants: None of the components are on this list.

OSHA – Highly Hazardous: CAS #7664-39-3 is considered highly hazardous by OSHA.

California Prop 65: No information available.

California No Significant Risk Level: No information available.

### CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

#### CCOHS WHMIS Classification:

D1A - Poisonous and infectious material - immediate and serious effects – Very toxic

D2A - Poisonous and infectious material - Other effects - Very toxic

E - Corrosive material

NOTE: The WHMIS Classification of D2A (chronic toxicity) for this chemical is currently under review.

WHMIS Health Effects Criteria Met by this Chemical: D1A - Acute lethality - very toxic - immediate, D1B - TDG class 6.1 packing group unknown - toxic - immediate, D2A - Chronic toxicity - very toxic - other, E - Corrosive to skin, E - TDG class 8 - corrosive substance  
WHMIS Ingredient Disclosure List: Included for disclosure at 1% or greater.

#### Detailed WHMIS Classification According to Criteria:

**Class A - Compressed Gas:** Does not meet criteria.

**Class B - Flammable and Combustible Material:** Does not meet criteria. Not combustible (does not burn).

**Class C - Oxidizing Material:** Does not meet criteria.

**Class D - Poisonous and Infectious Material. Division 1 - Immediate and Serious Toxic Effects:** Meets criteria for "Very toxic material".

**Acute Lethality:** "Very toxic". LC50 (mouse): 170 ppm (4- hour exposure); cited as 342 ppm (1-hour exposure); LD50 (oral, mouse): less than 40 mg/kg (cited as less than 2 mg/kg; at 40 mg/kg all animals (numbers not reported) died within 2 hours).

**Transportation of Dangerous Goods (TDG):** "Toxic"; class 6.1, packing group unknown.

**Class D - Poisonous and Infectious Material. Division 2 - Other Toxic Effects:** Meets criteria for "Very toxic material". See detailed evaluation below.

**Chronic Health Effects:** "Very toxic". Severe lung, liver and kidney damage and deaths observed in animals exposed to low concentrations (e.g. 30 ppm for 5 weeks produced complete mortality). Low concentrations cause fluorosis in humans.

**Carcinogenicity:** Does not meet criteria. Not included in standard reference lists.

**Teratogenicity and Embryotoxicity:** Insufficient information. There are insufficient details to evaluate the one animal study located.

**Reproductive Toxicity:** Insufficient information.

**Mutagenicity:** Insufficient information. The only available in vivo study is weak and inconclusive.

**Respiratory Tract Sensitization:** Does not meet criteria. Not reported as a human respiratory sensitizer.

**Skin Irritation:** Corrosive materials are not also classified as irritants.

**Eye Irritation:** Corrosive materials are not also classified as irritants.

**Skin Sensitization:** Does not meet criteria. Not reported as a skin sensitizer.

**Class E - Corrosive Material:** Meets criteria.

TDG Class 8. Corrosive to skin, carbon steel alloy 1020 and aluminum alloy 3003 at 55 °C (131 °F). No information on the corrosivity to aluminum alloy 7075-T6 was located.

**Class F - Dangerously Reactive Material:** Does not meet criteria.

Canadian DSL/NDSL: CAS# 7732-18-5 is listed on Canada's DSL/NDSL List. CAS# 7664-39-3 is listed on Canada's DSL/NDSL List.

#### EUROPEAN UNION (EU) CLASSIFICATION AND LABELLING INFORMATION

EU Index#: 009-003-00-1

EU Classification: Acute toxicity, Oral – Category 2  
Acute toxicity, Dermal – Category 1  
Acute toxicity, Inhalation – Category 2  
Skin corrosion – Category 1A  
Corrosive to metals – Category 1

EU Signal Word: Danger

EU Pictograms:



#### EU Hazard Statements:

H300: Fatal if swallowed.

H310: Fatal in contact with skin.

H330: Fatal if inhaled.

H314: Causes severe skin burns and eye damage.

H290: May be corrosive to metals.

#### EU Precautionary Statements:

P234: Keep only in original container.

P260: Do not breathe dust/fume/gas/mist/vapours/spray.

P262: Do not get in eyes, on skin, or on clothing.

P264: Wash thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P271: Use only outdoors or in a well-ventilated area.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P284: Wear respiratory protection.

P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302+P350: IF ON SKIN: Gently wash with plenty of soap and water.

P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310: Immediately call a POISON CENTER or doctor/physician.

P320: Specific treatment is urgent (see Section 4 for first aid instructions in case of skin exposure).

P321: Specific treatment (see P310).

P330: Rinse mouth.

P361: Remove/Take off immediately all contaminated clothing.

P363: Wash contaminated clothing before reuse.

P390: Absorb spillage to prevent material damage.

P403+P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

P406: Store in corrosion resistant container with a resistant inner liner.

P501: Dispose of contents/container according to federal, regional and local government requirements.

**Exposure Limits:** (listed under FLUORIDES, as F) OES-United Kingdom: TWA 2.5 mg/m<sup>3</sup>, STEL 3 ppm (2.5 mg/m<sup>3</sup>).



## **SECTION 16 – Other Information**

The statements contained herein are offered for informational purposes only and are based upon technical data. Seastar Chemicals Inc believes them to be accurate but does not purport to be all-inclusive. The above-stated product is intended for use only by persons having the necessary technical skills and facilities for handling the product at their discretion and risk. Since conditions and manner of use are outside our control, we (Seastar Chemicals Inc) make no warranty of merchantability or any such warranty, express or implied with respect to information and we assume no liability resulting from the above product or its use. Users should make their own investigations to determine suitability of information and product for their particular purposes.

## SAFETY DATA SHEET

Creation Date 12-Mar-2009

Revision Date 29-Aug-2018

Revision Number 9

### 1. Identification

**Product Name** Nitric acid (65 - 70%)

**Cat No. :** A198C-212, A200-212, A200-212LC, A200-500, A200-500LC, A200-612GAL, A200C-212, A200S-212, A200S-212LC, A200S-500, A200SI-212, A467-1, A467-2, A467-250, A467-500, A483-212; S719721

**CAS-No** 7697-37-2  
**Synonyms** Azotic acid; Engraver's acid; Aqua fortis

**Recommended Use** Laboratory chemicals.  
**Uses advised against** Food, drug, pesticide or biocidal product use

#### Details of the supplier of the safety data sheet

##### Company

Fisher Scientific  
One Reagent Lane  
Fair Lawn, NJ 07410  
Tel: (201) 796-7100

##### **Emergency Telephone Number**

CHEMTREC®, Inside the USA: 800-424-9300  
CHEMTREC®, Outside the USA: 001-703-527-3887

### 2. Hazard(s) identification

#### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing liquids	Category 3
Corrosive to metals	Category 1
Acute Inhalation Toxicity - Dusts and Mists	Category 3
Skin Corrosion/Irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1

#### Label Elements

##### **Signal Word**

Danger

##### **Hazard Statements**

May intensify fire; oxidizer  
May be corrosive to metals  
Causes severe skin burns and eye damage

Toxic if inhaled



### Precautionary Statements

#### Prevention

Do not breathe dust/fume/gas/mist/vapors/spray  
Wash face, hands and any exposed skin thoroughly after handling  
Wear protective gloves/protective clothing/eye protection/face protection  
Use only outdoors or in a well-ventilated area  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
Keep/Store away from clothing/ other combustible materials  
Take any precaution to avoid mixing with combustibles  
Keep only in original container  
Wear respiratory protection

#### Response

Immediately call a POISON CENTER or doctor/physician

#### Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing  
Immediately call a POISON CENTER or doctor/physician

#### Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower  
Wash contaminated clothing before reuse

#### Eyes

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

#### Ingestion

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

#### Fire

In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction

#### Spills

Absorb spillage to prevent material damage

#### Storage

Store locked up  
Store in a well-ventilated place. Keep container tightly closed  
Store in corrosive resistant polypropylene container with a resistant inliner  
Store in a dry place

#### Disposal

Dispose of contents/container to an approved waste disposal plant

#### Hazards not otherwise classified (HNOC)

Corrosive to the respiratory tract

## 3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Nitric acid	7697-37-2	65 - 70
Water	7732-18-5	30 - 35

## 4. First-aid measures

### General Advice

Immediate medical attention is required. Show this safety data sheet to the doctor in

	attendance.
<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Call a physician immediately.
<b>Inhalation</b>	If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove from exposure, lie down. Call a physician immediately.
<b>Ingestion</b>	Do not induce vomiting. Never give anything by mouth to an unconscious person. Clean mouth with water. Call a physician immediately.
<b>Most important symptoms and effects</b>	Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	CO <sub>2</sub> , dry chemical, dry sand, alcohol-resistant foam.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	Not applicable
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Oxidizing Properties</b>	Oxidizer
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

#### Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Oxidizer: Contact with combustible/organic material may cause fire. May ignite combustibles (wood paper, oil, clothing, etc.).

#### Hazardous Combustion Products

Nitrogen oxides (NO<sub>x</sub>) Thermal decomposition can lead to release of irritating gases and vapors

#### Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

#### NFPA

**Health**  
4

**Flammability**  
0

**Instability**  
0

**Physical hazards**  
OX

### 6. Accidental release measures

<b>Personal Precautions</b>	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Use personal protective equipment.
<b>Environmental Precautions</b>	Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information.

**Methods for Containment and Clean Up** Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal. Wear self-contained breathing apparatus and protective suit.

## 7. Handling and storage

**Handling** Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not ingest. Do not breathe vapors or spray mist. Keep away from clothing and other combustible materials.

**Storage** Keep containers tightly closed in a cool, well-ventilated place. Do not store near combustible materials.

## 8. Exposure controls / personal protection

### Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Nitric acid	TWA: 2 ppm STEL: 4 ppm	(Vacated) TWA: 2 ppm (Vacated) TWA: 5 mg/m <sup>3</sup> (Vacated) STEL: 4 ppm (Vacated) STEL: 10 mg/m <sup>3</sup> TWA: 2 ppm TWA: 5 mg/m <sup>3</sup>	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m <sup>3</sup> STEL: 4 ppm STEL: 10 mg/m <sup>3</sup>	TWA: 2 ppm TWA: 5 mg/m <sup>3</sup> STEL: 4 ppm STEL: 10 mg/m <sup>3</sup>

### Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

**Engineering Measures** Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

### Personal Protective Equipment

**Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tightly fitting safety goggles. Face-shield.

**Skin and body protection** Long sleeved clothing.

**Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures** Keep away from food, drink and animal feeding stuffs. When using, do not eat, drink or smoke. Contaminated work clothing should not be allowed out of the workplace. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. For environmental protection remove and wash all contaminated protective equipment before re-use. Wear suitable gloves and eye/face protection.

## 9. Physical and chemical properties

<b>Physical State</b>	Liquid
<b>Appearance</b>	Clear Colorless, Light yellow
<b>Odor</b>	Strong Acrid
<b>Odor Threshold</b>	No information available
<b>pH</b>	< 1.0 (0.1M)
<b>Melting Point/Range</b>	-41 °C / -41.8 °F

Boiling Point/Range	Not applicable
Flash Point	Not applicable
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	0.94 kPa (20°C)
Vapor Density	No information available
Specific Gravity	1.40
Solubility	miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	HNO <sub>3</sub>
Molecular Weight	63.01

## 10. Stability and reactivity

Reactive Hazard	Yes
Stability	Oxidizer: Contact with combustible/organic material may cause fire.
Conditions to Avoid	Incompatible products. Combustible material. Excess heat. Exposure to air or moisture over prolonged periods.
Incompatible Materials	Combustible material, Strong bases, Reducing agents, Metals, Powdered metals, Organic materials, Aldehydes, Alcohols, Cyanides, Ammonia, Strong reducing agents
Hazardous Decomposition Products	Nitrogen oxides (NO <sub>x</sub> ), Thermal decomposition can lead to release of irritating gases and vapors
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information

Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Mist LC50	Category 3. ATE = 1 - 5 mg/l. Category 4.
Vapor LC50	Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

#### Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Nitric acid	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h
Water	-	Not listed	Not listed

Toxicologically Synergistic Products	No information available
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### Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Causes severe burns by all exposure routes
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
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Nitric acid	7697-37-2	Not listed	Not listed	Not listed	Not listed	Not listed
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

**Developmental Effects** No information available.

**Teratogenicity** No information available.

**STOT - single exposure** None known

**STOT - repeated exposure** None known

**Aspiration hazard** No information available

**Symptoms / effects, both acute and delayed** Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated

**Endocrine Disruptor Information** No information available

**Other Adverse Effects** The toxicological properties have not been fully investigated.

## 12. Ecological information

### Ecotoxicity

Do not empty into drains. Large amounts will affect pH and harm aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nitric acid	Not listed	LC50: = 72 mg/L, 96h (Gambusia affinis)	Not listed	Not listed

**Persistence and Degradability** Miscible with water Persistence is unlikely based on information available.

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid	-2.3

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## 14. Transport information

### DOT

UN-No UN2031  
 Proper Shipping Name NITRIC ACID  
 Hazard Class 8  
 Subsidiary Hazard Class 5.1  
 Packing Group II

### TDG

UN-No UN2031  
 Proper Shipping Name NITRIC ACID  
 Hazard Class 8  
 Subsidiary Hazard Class 5.1  
 Packing Group II

### IATA

UN-No UN2031  
 Proper Shipping Name NITRIC ACID  
 Hazard Class 8  
 Subsidiary Hazard Class 5.1  
 Packing Group II

**IMDG/IMO**

UN-No UN2031  
 Proper Shipping Name NITRIC ACID  
 Hazard Class 8  
 Subsidiary Hazard Class 5.1  
 Packing Group II

**15. Regulatory information**

All of the components in the product are on the following Inventory lists: X = listed

**International Inventories**

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Nitric acid	X	X	-	231-714-2	-		X	X	X	X	X
Water	X	X	-	231-791-2	-		X	-	X	X	X

**Legend:**

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

**U.S. Federal Regulations**

TSCA 12(b) Not applicable

**SARA 313**

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nitric acid	7697-37-2	65 - 70	1.0

SARA 311/312 Hazard Categories See section 2 for more information

**CWA (Clean Water Act)**

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid	-	TQ: 500 lb

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability



Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nitric acid	1000 lb	1000 lb

**California Proposition 65** This product does not contain any Proposition 65 chemicals**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Nitric acid	X	X	X	X	X
Water	-	-	X	-	-

**U.S. Department of Transportation**

Reportable Quantity (RQ): Y  
DOT Marine Pollutant N  
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security**

This product contains the following DHS chemicals:

Component	DHS Chemical Facility Anti-Terrorism Standard
Nitric acid	2000 lb STQ

**Other International Regulations****Mexico - Grade** No information available**16. Other information**

**Prepared By** Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

**Creation Date** 12-Mar-2009  
**Revision Date** 29-Aug-2018  
**Print Date** 29-Aug-2018  
**Revision Summary** SDS sections updated. 2. 11.

**Disclaimer**

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

**End of SDS**