Table of Contents

1. Scope 2
2. Objective 2
3. Definitions 2
4. Responsibility 4
5. Procedure 4
   5.1 General Safety 4
   5.2 Lab Wear 5
   5.3 Chemicals 5
   5.4 First Aid 6
   5.5 Storage 7
   5.6 Waste Management and Disposal 7
   5.7 Emergency 8
   5.8 Flow Charts 9
6. Precautions 19
7. References 19
8. Appendices 19
9. Revision History 20

Original  
Authorised Copy  
Reading Copy  

Written by: Francesca Wirth  
Reviewed by: Janet Vella  
Approved by:  
Signature/Date:  
Signature/Date:  
Signature/Date:  

Page 1 of 29
1. Scope

This Standard Operating Procedure applies to the staff and students of the Pharmacy Department to follow the health and safety guidelines implemented for the laboratories of the Pharmacy Department, University of Malta.

2. Objective

To define the health and safety guidelines adopted for the laboratories of the Pharmacy Department, University of Malta.

3. Definitions

3.1. Biological waste: Waste containing mostly natural organic materials such as biological fluids, animal excrement and plant remains.

3.2. Bunsen burner: A small laboratory burner consisting of a vertical metal tube connected to a gas source and producing a very hot flame from a mixture of gas and air, let in through adjustable holes at the base.

3.3. Carbon dioxide fire extinguisher: A carbon dioxide based fire extinguisher, extinguishing the fire by eliminating the oxygen element of the fire triangle. It comes in a standard black container and is used on Class B and C fires only since it is ineffective on Class A fires.

3.4. Chemical hood: Formerly known as a fume cupboard, this is the primary control device used to avoid exposure when handling flammable and toxic chemicals. It mainly consists of a partially enclosed workspace that is exhausted to the outside of the building.

3.5. Class A Fire: Arises from ordinary combustible materials such as paper, wood, cardboard and plastic.

3.6. Class B Fire: Arises from flammable or combustible liquids such as gasoline, kerosene, petroleum oil, thinners and flammable gases such as propane and butane.

3.7. Class C Fire: Arises from energised electrical equipment such as appliances, switches, hot plates, stirrers and computers. Cutting the power supply will change this fire into one of the other types of fire.
3.8. **Dehydrating agent**: A chemical that is capable of removing water molecules from another agent.

3.9. **Fire Triangle**: Represents the 3 elements that must be present for a fire to exist and these are oxygen, heat and fuel.

3.10. **Flammable agent**: A chemical that can easily ignite and start a fire.

3.11. **Foam fire extinguisher**: A foam based extinguisher, extinguishing the fire by eliminating the heat element of the fire triangle. It comes in a standard cream container and can be used on Class A and B fires only. No to be used with Class C fires due to risk of an electrical shock.

3.12. **General waste**: Non-hazardous waste that does not pose an immediate threat to men and the environment.

3.13. **Hazardous waste**: Waste that may cause injury to the exposed individual or the environment.

3.14. **Inventory**: A detailed list of all the chemicals present in the laboratories and in the stores, together with their quantities.

3.15. **Material Safety Data Sheet (MSDS)**: A sheet that contains data regarding the properties of a chemical and is intended to provide laboratory personnel with the procedures for handling the chemicals safely.

3.16. **Organic agent**: A substance which is typically characterised as having carbon and hydrogen as its main building blocks, but may also contain oxygen, nitrogen and a variety of other elements.

3.17. **Oxidising agent**: A chemical that readily transfers oxygen atoms or gains electrons in a redox reaction, becoming reduced in the process.

3.18. **Powder Dry Chemical Extinguisher**: A powder based extinguisher, extinguishing the fire by primarily interrupting the chemical reaction of the fire triangle. It comes in a standard blue container and can be used on Class A, B and C fires.

3.19. **Reducing agent**: A chemical that donates electrons in a redox reaction, becoming oxidised in the process.
3.20. **Session:** A 2 to 3 hour laboratory exercise for pharmacy and pharmaceutical technology students as part of their academic curriculum.

4. **Responsibility**

4.1. The members of the Department of Pharmacy (staff and students) are responsible for following the SOP.

4.2. The designated Laboratory Officer or Laboratory Assistant is responsible for ensuring that this SOP is followed.

5. **Procedure**

5.1. **General Safety**

5.1.1. Ensure that only authorised personnel are allowed in the laboratory and that their entry is recorded in ‘Entry Logbook’.

5.1.2. Ensure that no more than 10 students are present in the laboratory in each session.

5.1.3. Do not run or throw items in the laboratory.

5.1.4. Be alert for unsafe conditions and actions and call attention to them so that corrective action can be taken.

5.1.5. Ensure that defective equipment is not used.

5.1.6. Do not sit on laboratory benches.

5.1.7. Do not eat, drink, smoke, chew gum, apply cosmetics or manipulate contact lenses in the laboratory.

5.1.8. Tie long hair.

5.1.9. Remove scarves and coats.

5.1.10. Remove dangling jewellery to prevent unnecessary accidents.

5.1.11. Place bags or clothes in a designated area out of the way.

5.1.12. Ensure that work areas are kept clean and uncluttered.

5.1.13. Ensure that the floor is kept clear of all objects.

5.1.14. Ensure that no flammable solvents are in the surrounding area when lighting a flame.

5.1.15. Ensure that lit bunsen burners are not left unattended.

5.1.16. Keep waste in its appropriate containers and label them for proper disposal.

5.1.17. Wash hands well with soap and water after handling chemicals.
5.2. Lab Wear

5.2.1. Wear a cotton or polycotton lab coat and keep it buttoned at all times.
5.2.2. Ensure that lab coat is replaced if it comes into contact with hazardous chemicals.
5.2.3. Wear shoes that adequately cover the whole foot to protect feet from spillages.
5.2.4. Ensure that safety specs are worn when handling substances that may harm your eyes. Normal prescription eye glasses do not provide appropriate laboratory eye protection.
5.2.5. Ensure that an appropriate mask is used whenever fumes or dust may be inhaled.
5.2.6. Ensure that disposable gloves are used when handling chemicals.
5.2.7. Ensure that appropriate acid/base resistant long gloves are used when handling strong acids or bases.

5.3. Chemicals

5.3.1. Perform regular annual inventory inspections of chemicals and update accordingly.
5.3.2. Read the label of chemical containers carefully and be familiar with the storage, handling and disposal procedures of the chemicals.
5.3.3. Be familiar with the safety symbols present on the containers of the chemicals present. A list of common safety symbols encountered is present in the ‘Common Safety Symbols’ Table (SOP/PD/103_03/A1).
5.3.4. Compile all the MSDSs of the chemicals present (Template in SOP/PD/103_03/A2), store in a designated file and place it in a central easily accessible location in the laboratory for reference by all staff and students. Review MSDS every 2 years.
5.3.5. Ensure that when weighing out a chemical, weight out only the amount that is needed and do not return the excess to its original container, but dispose of it in the appropriate waste container.
5.3.6. Avoid exposure of chemicals to heat and direct sunlight.
5.3.7. Ensure that when mixing concentrated acids with water, never add water to the acid but always add the acid slowly to the water.
5.3.8. Keep chemical containers closed unless actively in use.
5.3.9. Store strong oxidisers in a glass container, in a metal tray away from reducing, organic, dehydrating and flammable agents.
5.3.10. Ensure that a chemical hood is used whenever there is the possibility of the release of toxic chemical vapours, dust or gases.
5.3.11. Keep head and body outside of the hood face and place the chemicals and equipment at least 15cm within the hood to ensure proper air flow.
5.3.12. Ensure that when a chemical spill occurs, neutralise acids with powdered sodium hydrogen carbonate (baking soda) and bases with 5% acetic acid solution (vinegar). Avoid inhaling any vapours which can be produced and spread appropriate sand to absorb the neutralised chemical. Sweep up and dispose of as hazardous waste.
5.3.13. Ensure that when a chemical spill comes into direct contact with human skin, flush the area with copious amounts of cold water for at least 5 minutes and seek medical attention if damage to skin is evident.
5.3.14. Ensure that stained clothes are removed immediately.

5.4. First Aid

5.4.1. Ensure that the following items are present in each first aid box:

5.4.1.1. Cotton wool
5.4.1.2. Surgical gauze
5.4.1.3. Bandages
5.4.1.4. Surgical spirit
5.4.1.5. Surgical tape
5.4.1.6. Plasters/plaster roll
5.4.1.7. Burn spray
5.4.1.8. Antiseptic spray
5.4.1.9. Iodine tincture
5.4.1.10. Scissors
5.4.1.11. Saline ampoules
5.4.1.12. Eye wash station

5.4.2. Ensure that missing items are replaced when used.
5.4.3. Check all available first aid boxes every 2 months to replace any missing or expired items.

5.5. Storage

5.5.1. Organise chemicals by compatibility, then store alphabetically within the same compatible groups.
5.5.2. Ensure that chemicals are not stored above eye level.
5.5.3. Ensure that chemicals are not stored on the floor.
5.5.4. Ensure that corrosives are not stored on high shelves.
5.5.5. Ensure that chemical storage areas are adequately ventilated.
5.5.6. Ensure that flammable liquids are stored in a flame resistant cabinet.
5.5.7. Ensure that chemical hood is not used as a storage area for chemicals and solvents.
5.5.8. Ensure that all materials present in the laboratory refrigerator are labelled with:

5.5.8.1. Name and course year (if applicable)
5.5.8.2. Storage date
5.5.8.3. Disposal date
5.5.8.4. Storage conditions

5.5.9. Ensure that no food or beverages are stored in a refrigerator used for laboratory work.

5.6. Waste Management and Disposal

5.6.1. Ensure that classroom demonstrations are performed for experiments that generate large amounts of chemical waste.
5.6.2. Distinguish between general and hazardous waste.
5.6.3. Place general waste in designated plastics bags.
5.6.4. Label hazardous waste and give to the laboratory officer present for safe disposal.
5.6.5. Flush small quantities of aqueous solutions down the drain.
5.6.6. Store large volumes of non-aqueous solutions in labelled glass bottles and give to laboratory officer for safe disposal.
5.6.7. Ensure that broken glassware and sharp objects are properly disposed of in designated containers.
5.6.8. Ensure that biological waste (such as blood and urine) is disposed of as bio-hazardous waste.
5.7. Emergency

5.7.1. Ensure that emergency phone number (Fire and Ambulance 112) is posted on the laboratory doors.

5.7.2. Be familiar with the location and use of the first aid box and its contents.

5.7.3. Ensure that Foam, Powder and Carbon dioxide type fire extinguishers are present at the exit of each laboratory.

5.7.4. Ensure that access to fire extinguishers is unobstructed.

5.7.5. Limit the use of fire extinguishers to trained personnel and only use if fire is small, contained and has yet not spread beyond its starting point.

5.7.6. Recharge fire extinguisher immediately after use regardless of how much it was used.

5.7.7. Do not attempt to fight the fire if this is not small. Leave the laboratory, close door and phone 112 immediately.

5.7.8. Leave the laboratory if fumes are being released.

5.7.9. Call 112 in case of life threatening injuries such as severe burns, loss of consciousness and uncontrolled bleeding.
5.8. Flow Charts

5.8.1. General Safety

Start

Only authorised personnel allowed in laboratory

Yes

No

Allow access only to authorised personnel

Entrance into laboratory recorded into entry logbook

Yes

No

Record entry

More than 10 students present in a session

Yes

No

Allow only 10 or less students per session

Do not run or throw items in laboratory

Unsafe conditions / actions

Yes

No

Call attention to them so that corrective action is taken

Defective equipment being used

Yes

No

Stop using immediately

Do not sit on laboratory benches

Do not eat, drink, smoke, chew gum, apply cosmetics or manipulate contact lenses

Long hair

Yes

No

Tie backwards

Scarfves and coats

Yes

No
1. Remove and place in designated area for personal belongings

2. Dangling jewellery
   - Yes: Remove and place in designated area for personal belongings
   - No: Work areas clean and uncluttered
     - No: Clean and organise work areas
     - Yes: Floor kept clear of all objects
       - No: Clear floors
       - Yes: Flammable solvents in vicinity when lighting a flame
         - Yes: Remove from surrounding area
         - No: Lit bunsen burner/s left unattended
           - Yes: Keep waste in appropriate containers and label for proper disposal
           - No: Wash hands well with soap and water after handling chemicals

End
5.8.2 Lab Wear

Start

Wear cotton lab coat and keep buttoned at all times

Lab coat came into contact with hazardous chemical/s

Yes

Replace lab coat

No

Wear shoes that adequately cover whole foot

Safety specs worn when handling substances that may harm eyes

Yes

Wear safety specs even if you have prescription glasses

No

Appropriate mask used whenever fumes or dust may be inhaled

Yes

Use accordingly

No

Disposable gloves used when handling chemicals

Yes

Use accordingly

No

Acid/base resistant long gloves used when handling strong acids or bases

Yes

Use accordingly

No

End
5.8.3 Chemicals

Start

Perform regular annual inventory inspections of chemicals and update accordingly

Read label of chemical containers and be familiar with their storage, handling and disposal procedures

Be familiar with safety symbols present on containers of chemicals (see Appendix 1)

Compile all MSDSs of chemicals present and store in designated file that is easily accessed

Weighing out a chemical

Yes

Weigh out only amount needed and do not return excess to original container but dispose of in appropriate waste container

No

Avoid exposure of chemicals to heat and direct sunlight

Mixing concentrated acids with water

Yes

Add the acid slowly to the water and not the other way round

No

Keep chemical containers closed unless actively in use

Store strong oxidisers in glass container, in a metal tray away from reducing, organic, dehydrating and flammable agents

Need to use chemical hood

Yes

Keep head and body outside of hood face and place chemical and equipment at least 15cm within hood to ensure proper air flow

No

1
1. Chemical spill
   Yes
   Neutralise acids with powdered sodium hydrogen carbonate (baking soda) and bases with 5% acetic acid solution (vinegar)
   Spread appropriate sand and avoid inhaling any fumes that might be produced
   Sweep up and dispose of as hazardous waste

2. Chemical spill in direct contact with human skin
   Yes
   Flush area with copious amounts of cold water for at least 5 minutes
   Damage to skin is evident
   Yes
   Seek medical attention
   No
   Clothes stained
   Yes
   Remove immediately
   No

End
5.8.4 First Aid

Start

Items listed in section 5.4.1 present in each first aid box

Yes

No

Include missing items

Check all first aid boxes every two months

End

Missing items replaced when used/expired

Yes

No

Replace when missing/expired

Yes

No

Yes
5.8.5 Storage

Start

Organise chemicals by compatibility, then store alphabetically within the same compatible groups

Yes

No

Chemicals stored above eye level

Chemicals stored on the floor

Alter storage arrangement to alleviate this

Alter storage arrangement to alleviate this

Chemical storage areas adequately ventilated

Provide ventilation

Flammable liquids stored in flame resistant cabinet

Store accordingly

Chemical hood used as storage area for chemicals and solvents

Remove from chemical hood

Materials present in refrigerator labelled as specified in section 5.5.8

Label accordingly

Food or beverages stored in refrigerator used for laboratory work

Remove from refrigerator

Yes

No

Yes

No

Yes

No

No

Yes

No

Yes

No
5.8.6. Waste Management and Disposal

Start

Classroom demonstrations performed for experiments that generate large amounts of chemical waste

Distinguish between general and hazardous waste

Yes

General waste produced

Place in designated plastic bags

No

Perform classroom demonstration in these cases

Hazardous waste produced

Label and give to laboratory officer

Handling aqueous solutions

flush in small quantities down the drain

Handling non-aqueous solutions

Store in labelled glass bottles and give to laboratory officer

Handling broken glassware/sharp objects

Dispose of in designated containers

Yes

Biological waste disposed of as bio-hazardous waste

Dispose of accordingly

End
5.8.7. Emergency

Start

Emergency phone number sticker posted on laboratory doors

Yes

Be familiar with location and use of first aid box and its contents

No

Post accordingly

Yes

Foam, Powder and CO₂ fire extinguishers present at exit of each laboratory

Yes

Buy necessary fire extinguisher/s

No

Provide access

Yes

Access to fire extinguishers unobstructed

Yes

Fire present

No

Leave laboratory, close door and phone 112 immediately

Yes

Fire small, contained and has yet not spread beyond its starting point

No

Delegate task to trained individual

Yes

Know how to operate fire extinguisher

No

Delegate task to trained individual

Yes

Delegate task to trained individual

Page 17 of 29
Use fire extinguisher

Recharge fire extinguisher immediately after use regardless of how much it was used

Fumes present

Yes

Leave laboratory

No

Life threatening emergencies

Yes

Call 112 immediately

No

End

3

4

1

2

Valid for:
2 years from approval

Ref. No.
SOP/PD/103_03
6. Precautions

Same as Section 5; Procedure

7. References


8. Appendices

SOP/PD/103_03/A1 – Common Safety Symbols Table

SOP/PD/103_03/A2 – Material Safety Data Sheet Template
9. Revision History

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Amendments/ Reasons for change</th>
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<tbody>
<tr>
<td>01</td>
<td>Initial Release</td>
</tr>
<tr>
<td>02</td>
<td>Change in Scope and Objective</td>
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<tr>
<td></td>
<td>Addition of 16 new definitions</td>
</tr>
<tr>
<td></td>
<td>Additional information added to all 7 sections of the procedure</td>
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<td></td>
<td>Removal of Sharps section</td>
</tr>
<tr>
<td></td>
<td>Additional information about the use of fire extinguishers</td>
</tr>
<tr>
<td></td>
<td>Inclusion of flow charts</td>
</tr>
<tr>
<td></td>
<td>More sourced references</td>
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<tr>
<td></td>
<td>Appendix 1 with Common Safety symbols</td>
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<td>03</td>
<td>Definition of MSDS amended</td>
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<tr>
<td></td>
<td>List of first aid items in 5.4.1 updated</td>
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<td></td>
<td>Inclusion of MSDS Template as A2</td>
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<td>References updated</td>
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### SOP/PD/103_03/A1 – Common Safety Symbols Table

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<tr>
<th>Symbol</th>
<th>Meaning of Symbol</th>
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<td><img src="example.com" alt="Compressed Gas symbol" /></td>
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<tr>
<td><img src="example.com" alt="Corrosive symbol" /></td>
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<tr>
<td><img src="example.com" alt="Environmental Hazard symbol" /></td>
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<tr>
<td><img src="example.com" alt="Explosive symbol" /></td>
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</tr>
<tr>
<td><img src="example.com" alt="Flammable symbol" /></td>
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</table>
Adapted from the Globally Harmonised System of Classification and Labelling of Chemicals, United Nations New York and Geneva, 2005
SOP/PD/103_03/A2 – Material Safety Data Sheet Template

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<th>UNIVERSITY OF MALTA</th>
<th>MATERIAL SAFETY DATA SHEET</th>
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<td>FACULTY OF MEDICINE &amp; SURGERY</td>
<td>Ref. No. MSDS /PD/XXX_XX</td>
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<td>PHARMACY DEPARTMENT</td>
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**[INSERT NAME OF CHEMICAL]**

Table of Contents

<table>
<thead>
<tr>
<th></th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chemical Product</td>
<td>X</td>
</tr>
<tr>
<td>2. Composition and Information on Ingredients</td>
<td>X</td>
</tr>
<tr>
<td>3. Hazards Identification</td>
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</tr>
<tr>
<td>4. First Aid Measures</td>
<td>X</td>
</tr>
<tr>
<td>5. Fire and Explosion Data</td>
<td>X</td>
</tr>
<tr>
<td>6. Accidental Release Measures</td>
<td>X</td>
</tr>
<tr>
<td>7. Handling and Storage</td>
<td>X</td>
</tr>
<tr>
<td>8. Exposure Controls/ Personal Protection</td>
<td>X</td>
</tr>
<tr>
<td>9. Physical and Chemical Properties</td>
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</tr>
<tr>
<td>10. Stability and Reactivity Data</td>
<td>X</td>
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<tr>
<td>11. Toxicological Information</td>
<td>X</td>
</tr>
<tr>
<td>12. Ecological Information</td>
<td>X</td>
</tr>
<tr>
<td>13. Disposal Considerations</td>
<td>X</td>
</tr>
<tr>
<td>14. Other Information</td>
<td>X</td>
</tr>
<tr>
<td>15. References</td>
<td>X</td>
</tr>
<tr>
<td>16. Appendices</td>
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</tr>
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<td>17. Revision History</td>
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</tbody>
</table>

Written by: [Insert Text] Signature/Date:[Insert Text]

Reviewed by: [Insert Text] Signature/Date:[Insert Text]

Approved by: [Insert Text] Signature/Date:[Insert Text]
### 1. Chemical Product

**Product Name:** [Insert Text]

**Chemical name:** [Insert Text]

**Synonyms:** [Insert Text]

**Chemical Formula:** [Insert Text]

### 2. Composition and Information on Ingredients

**Composition:** [Insert Text]

**Toxicological Data on Ingredients:** [Insert Text]

### 3. Hazards Identification

**Potential Acute Health Effects:** [Insert Text]

**Potential Chronic Health Effects:**

- **CARCINOGENIC EFFECTS:** [Insert Text]
- **MUTAGENIC EFFECTS:** [Insert Text]
- **TERATOGENIC EFFECTS:** [Insert Text]
- **DEVELOPMENTAL TOXICITY:** [Insert Text]

### 4. First Aid Measures

**General measures:** [Insert Text]

**Skin contact:** [Insert Text]

**Serious skin contact:** [Insert Text]
**5. Fire and Explosion Data**

<table>
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<tr>
<th>Property</th>
<th>Description</th>
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<tbody>
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<td>Flammability of the Product:</td>
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<td>Auto-Ignition Temperature:</td>
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<td>Flash points:</td>
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<td>Flammable limits:</td>
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<td>Products of Combustion:</td>
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<td>Fire Hazards in Presence of Various Substances:</td>
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<tr>
<td>Explosion Hazards in Presence of Various Substances:</td>
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<td>Fire fighting media and Instructions:</td>
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<tr>
<td>Special Remarks on Fire Hazards:</td>
<td>[Insert Text]</td>
</tr>
<tr>
<td>Special Remarks on Explosion Hazards:</td>
<td>[Insert Text]</td>
</tr>
</tbody>
</table>
### 6. Accidental Release Measures

NB: Wear appropriate protective equipment/clothing including gloves before removing any spills.

**Small spill:** [Insert Text]

**Large spill:** [Insert Text]

### 7. Handling and Storage

**Precautions:** [Insert Text]

**Storage:** [Insert Text]

### 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:** [Insert Text]

**Engineering Controls:** [Insert Text]

**Personal Protection:** [Insert Text]

### 9. Physical and Chemical Properties

**Physical state and appearance:** [Insert Text]

**Odour:** [Insert Text]

**Taste:** [Insert Text]

**Molecular Weight:** [Insert Text]
pH (1% solution/water): [Insert Text]

Boiling Point: [Insert Text]

Melting Point: [Insert Text]

Critical Temperature: [Insert Text]

Specific Gravity (Water = 1): [Insert Text]

Vapour Pressure (mmHg): [Insert Text]

Vapour Density: [Insert Text]

Volatility: [Insert Text]

Odour Threshold: [Insert Text]

Water/Oil Distribution Coefficient: [Insert Text]

Ionicity (in Water): [Insert Text]

Dispersion Properties: [Insert Text]

Solubility: [Insert Text]

### 10. Stability and Reactivity Data

Stability: [Insert Text]

Corrosivity: [Insert Text]

Instability temperature: [Insert Text]

Conditions of Instability: [Insert Text]

Incompatibles: [Insert Text]

Polymerization: [Insert Text]
### 11. Toxicological Information

**Toxicity to animals:** [Insert Text]

**Effects on humans:**

**Acute potential health effects:** [Insert Text]

**Chronic potential health effects:**

- **MUTAGENIC EFFECTS:** [Insert Text]
- **TERATOGENIC EFFECTS:** [Insert Text]
- **DEVELOPMENTAL TOXICITY:** [Insert Text]

**Other information:** [Insert Text]

### 12. Ecological Information

**Ecotoxicity:** [Insert Text]

### 13. Disposal Considerations

**Waste Disposal:** [Insert Text]

### 14. Other Information

[Insert Text]
15. References

[Insert Text]

16. Appendices

Waste Disposal: [Insert Text]

17. Revision History

<table>
<thead>
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<th>Version Number</th>
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</tr>
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