SAFETY DATA SHEET

Product:	Medifume Fumigant	**Date Prepared:** 14 December 2021
Company:	Tec Gas Pty Ltd	Replaces: 20 Dec 2016

1 IDENTIFICATION

Product Name: Medifume Fumigant

Chemical Names: Ethylene oxide, Oxirane, Dimethylene oxide

Uses: Compressed gas for sterilisation and fumigation

Supplier:

Name: Tec Gas Pty Ltd

Address: Suite 18, 12 Tryon Rd, Lindfield, NSW 2070

Telephone: 1300 209 009

Website: http://www.specialtygases.com.au

Emergency Telephone: 1300 209 009

2 HAZARDS IDENTIFICATION

The hazard information contained in this section is for non-users handling the product and its ingredients. Users should refer to the APVMA approved label on the container for advice in relation to use and handling of the product.

Classified as hazardous according to the criteria of the GHS as adopted in Australia. A Dangerous Good according to ADG 7.7

Hazard Class and Category:
Gases under pressure
Flammable gas – category 1A
Chemically unstable gas A
Acute oral toxicity – category 4
Acute inhalation – category 3
Eye corrosion irritation – category 1
Skin corrosion/irritation – category 1B
Skin Sensitivity – 1B
Germ cell mutagenicity – category 1B
Carcinogenicity – category 1B
Reproduction 1B
Specific target organ toxicity (single exposure) – Category 3
Specific target organ toxicity (repeated exposure) – category 1

Signal Word: Danger
Poison Schedule: 7

Hazard Statements:
H220 Extremely flammable gas
H230 May react explosively even in the absence of air
H280 Contains gas under pressure; may explode if heated
H302 Harmful if swallowed
H331 Toxic if inhaled
H314 Causes sever skin burns and eye damage
H318 Causes serious eye damage
H317 May cause an allergic skin reaction
H340 May cause genetic defects
H350 May cause cancer
H360 May damage fertility or the unborn child
H335 May cause respiratory irritation
H372 Causes damage to organs <...> through prolonged or repeated exposure

Precautionary Statements:
Prevention
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, sparks, open flames and hot surfaces – No smoking.
P260 Do not breathe gas.
P264 Wash exposed skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves, eye and face protection.

Response
P314 Get medical advice/attention if you feel unwell
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P301 + P312 +P330 + P331 **IF SWALLOWED**: Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER or doctor if you feel unwell.
P330 Rinse mouth.
P303 + P361 + P352 **IF ON SKIN** (or hair): Take off immediately all contaminated clothing. Wash with plenty of water [or shower].
P363 Wash contaminated clothing before reuse.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P304 + P340 + P312 **IF INHALED**: Remove victim to fresh air and keep comfortable for breathing. Immediately Call a POISON CENTER or doctor if you feel unwell.
P305 + 310 + P351 + P338 **IF IN EYES**: Rinse cautiously with water for several minutes. Remove contact lenses. Continue rinsing. Immediately Call a POISON CENTER or doctor.
P362 + P364 Take off contaminated clothing and wash before reuse.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage eliminate all ignition sources.

Storage
P403+ P233 Store in well-ventilated place. Keep container tightly closed.
P405 Store locked up.

Disposal
P501 Dispose of contents in accordance with local Regulations.

3 COMPOSITION AND INFORMATION ON INGREDIENTS

Substance Name	CAS Number	Concentration
Ethylene Oxide	75-21-8	100%

4 FIRST-AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone 13 11 26.

First-Aid	
Inhalation	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a doctor.
Skin Contact	IF ON SKIN: Wash with plenty of soap and water. Contact with liquid can cause freeze burns. In case of freeze burns do not remove clothes. Seek medical advice.
Eye Contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.
Ingestion	Not expected to be a primary route of exposure. IF SWALLOWED: Immediately call a POISON CENTER or doctor. Give water to drink if victim completely conscious/alert. Do not induce vomiting.
Advice to Doctor	Symptoms may not occur for some hours. Treat with corticosteroid spray as soon as possible after inhalation. Obtain medical assistance.
Symptoms caused by exposure	In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. May cause irritation to cornea (with temporary disturbance to vision). May cause irritation to skin.

	Refer to section 11.

5 FIRE-FIGHTING MEASURES

Extinguishing Media:	Shut off supply. Let fire burn itself out if no risk to surroundings. Otherwise use powder, alcohol-resistant foam, water spray. Do not use carbon dioxide or water jet.
Specific hazards arising from the chemical:	EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents. Exothermic polymerization is possible (see incompatible materials).
Special protective equipment and precautions for firefighters:	DANGER! Cancer and reproductive hazard. DANGER! Toxic, flammable liquefied gas FORMS EXPLOSIVE MIXTURES WITH AIR Evacuate all personnel from the danger area. Use gas tight chemically protective clothing in combination self-contained breathing apparatus (SCBA). If possible, stop flow of product. Use water spray or fog to knock down fire fumes if possible. Immediately cool containers with water from maximum distance. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. Prevent run-off from entering drains, sewers and waterways.
Hazchem Code:	2PE

6 ACCIDENTAL RELEASE MEASURES

Emergency Procedures:

Isolate from all sources of ignition. Take precautions against static discharge. Try to stop release. Evacuate area. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. All equipment should be grounded. Wear self-contained breathing apparatus and chemical resistant, gas-tight protective clothing if exposed to gas. Stay upwind.

Ensure adequate air ventilation. Ensure gas does not accumulate. Do not smoke, eat or drink when using product. Wash hands and exposed skin thoroughly after handling. Take off contaminated clothing and wash before reuse.

Environmental precautions: Shut off leaks where possible and safe to do so. Reduce vapour with fog or fine water spray. Do not allow material to enter waterways or sewer. If large quantities of this material enter the waterways contact the Environmental Protection Authority.

Methods and materials for containment and cleaning up of spill:

Evacuate from area all non-essential personnel. Liquified gas. Spills will vaporise. Remove gas with fine water spray. Ensure gas does not accumulate in any location. Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost). Keep away from all heat/sparks/open flames/hot surfaces. Use spark proof tools and grounded equipment. Wash contaminated equipment or sites of leaks with copious quantities of water. Hose down area with water but NEVER direct water jet on liquid. Ventilate area.

7 HANDLING AND STORAGE

Precautions for Safe Handling:

Do not breathe gas.

Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use.

Do not smoke while handling product.
Avoid exposure, obtain special instructions before use.

Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Installation of a cross purge assembly between the cylinder and the regulator is recommended. Purge system with dry inert gas (e.g. nitrogen) before gas is introduced and when system is taken out of service.

Avoid suck back of water, acid and alkalis.

Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment. Purge air from system before introducing gas. Take precautionary measures against static discharge. Keep away from ignition sources (including static discharges). Consider the use of only non-sparking tools.

Do not allow backfeed into the container.

Protect cylinders and drums from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating cylinder or drum valve discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep container valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.

Close container valve after each use and when empty, even if still connected to equipment.

Never attempt to transfer gases from one cylinder/container to another.

Never use direct flame or electrical heating devices to raise the pressure of a container.

Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Conditions for Safe Storage:

Store locked up. Keep out of reach of children and unauthorised persons and away from oxidising materials dwellings, animals, food, feedstuffs, seeds and fertilisers. Store in dry, well-ventilated cool (below 50°C) area away from ignition sources, including flames and heat. Protect from sunlight. Keep containers closed with valve guards or caps in place. Cylinders should be stored in the vertical position and drums in the horizontal position properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage.

Store containers in location free from fire risk and away from sources of heat and ignition and combustible materials.

Store away from oxidising materials.

All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure Limits: Exposure limits have been established by Safe Work Australia for some components of this product.

Substance	TWA (ppm)	TWA (mg/m^3)	STEL (ppm)	STEL mg/m^3)	Comments
Ethylene oxide	1	1.8			Probable Human Carcinogen

Engineering Controls: Ensure adequate general and local ventilation. Product to be handled in a closed system. Preferably use only permanent leak-tight installations (e.g. welded pipes). Systems under pressure should be regularly checked for leakages. If forced ventilation required use only spark resistant fans.

Keep away from all heat/sparks/open flames/hot surfaces. Ensure all equipment is grounded. Use spark resistant tools.

Ensure exposure is below occupational exposure limits. Gas detectors should be used when toxic gases may be released.

Consider work permit system e.g. for maintenance activities.

Personal Protective Equipment (Manufacturing environment):

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select appropriate PPE. Protect eyes, face and skin from liquid splashes. PPE compliant to the recommended AS/NZS standards should be selected.

Respiratory Protection:

Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. AS/NZS 1715 recommends a cartridge change schedule be developed instead of relying on contaminant warning properties. It is recommended to consult a reputable filter supplier for a suitable filter such a Filter B (grey). Gas filters do not protect against oxygen deficiency. Keep self-contained breathing apparatus readily available for emergency use. Self-contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

Eye and Face Protection:

Self-contained breathing apparatus (SCBA) or supplied air respirator. Wear goggles and a face shield when transfilling or breaking transfer connections. Provide eyewash and safety shower near potential areas of exposure.

Skin and Body Protection:

Chemical resistant clothing buttoned to neck and wrist. Recommend the use of flame resistant anti-static safety clothing. Wear chemical resistant gloves when transfilling or breaking transfer connections. Consult glove manufacturer's product information on material suitability and material thickness. The breakthrough time of the selected gloves must be greater than the intended use period. Wear chemical resistant safety footwear. Provide eyewash and safety shower near potential areas of exposure. Keep suitable chemically resistant protective clothing readily available for emergency use.

Thermal Hazards:

Liquid can cause burns. Wear resistant gloves if there is risk of exposure to liquid.

9 PHYSICAL AND CHEMICAL PROPERTIES

physical state/colour	Colourless gas	**pH**	Not applicable for gases and gas mixtures
odour	Sweet, ether like.	**kinematic viscosity**	No reliable data available.
melting point/freezing point	-112°C	**solubility**	Miscible with water.
boiling point or initial boiling point and boiling range	10.4°C	**partition coefficient: n-octanol/water (log value)**	Not applicable for inorganic products

flammability	Extremely Flammable gas	**vapour pressure**	1.4 bar at 20°C
lower and upper explosion limit/flammability limit	2.6% - 100%	**relative density (water = 1)**	0.89
flash point	Minus 20°C	**relative gas density (air =1)**	1.52 at 20°C
Auto-ignition temperature	429°C	**particle characteristics**	Not applicable
decomposition temperature	Not applicable	**Critical Temperature**	195.°C

Other information: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Reactivity: Exothermic polymerization is possible (see incompatible materials).

Stability: Stable under normal conditions.

Conditions to Avoid: Heat and sources of ignition. Pure ethylene oxide decomposes violently if exposed to a high enough temperature. The temperature required for decomposition can vary depending on time, pressure, and conditions within the system and is reduced as pressure and volume-to-surface ratios are increased. Decomposition temperatures ranging from 450°C - 560°C have been observed in experimental apparatus.

Incompatible Materials: Oxidizing agents. Mercaptans. Alcohols. Alkali metals, Alkaline earth metals, Acetylide forming metals, Chromium, Titanium > 550°C, Uranium (U) > 750°C, Magnesium > 775°C. Will polymerize violently if contaminated with: Amines. alkalis. Acids. Mineral acids. Metal chlorides. Metal oxides. Water. Organic materials.

All equipment and piping to handle ethylene oxide should be constructed of stainless steel.

Hazardous Decomposition Products: Asphyxiating gases (carbon monoxide, carbon dioxide) can be formed.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity:

Oral:

Rat LD_{50} 72 - 330 mg/kg

Inhalation:

1.44 mg/L/4 hr (rat).

Dermal:

Low toxicity. Estimated LD_{50} >2000 mg/kg

Skin Corrosion/Irritation:

Will cause irritation.

Eye Damage/Irritation:

Will cause severe eye irritation when liquid or mists sprayed into the eye.

Sensitisation:

May cause skin sensitivity.

Germ cell mutagenicity:

May cause genetic defects

Carcinogenicity:

May cause cancer in humans by inhalation.

Reproductive toxicity:

May damage fertility or the unborn child.

Specific Target Organ Toxicity:

Single exposure: May cause irritation to the respiratory tract. Damage to red blood cells (haemolytic poison).

Repeated exposure: Causes damage to organs (nervous system, kidneys) through prolonged or repeated exposure. Damage to red blood cells (haemolytic poison).

Aspiration Hazard:

No information found.

This Substance does not meet the criteria for classification as an aspiration hazard.

Information on possible routes of exposure:

Eye contact, inhalation and dermal.

Early onset symptoms related to exposure:

The acute effects of ethylene oxide in humans consist mainly of central nervous system depression and irritation of the eyes and mucous membranes.

Delayed health effects from exposure:

Chronic exposure to ethylene oxide in humans can cause irritation of the eyes, skin, nose, throat, and lungs, and damage to the brain and nervous system. There also is some evidence linking ethylene oxide exposure to reproductive effects. EPA has concluded that ethylene oxide is carcinogenic to humans by the inhalation route of exposure. Evidence in humans indicates that exposure to ethylene oxide increases the risk of lymphoid cancer and, for females, breast cancer.

Exposure levels and health effects:

Exposure to high concentrations of ethylene oxide vapor or eye splashes of concentrated solutions can cause eye irritation, inflammation of the eye membrane and corneal injury. Exposure to ethylene oxide has also been linked to the development of cataracts. See section 8 for maximum exposure levels.

Interactive Effects:

No information found.

12 ECOLOGICAL INFORMATION

Ecotoxicity:

Ethylene Oxide: Harmful to aquatic organisms. LC_{50}: 84 mg/L/96 hr (fathead minnow).

Persistence and Degradability:

Ethylene Oxide rapidly degraded.

Bioaccumulation Potential:

Not expected to bioaccumulate due to the low log K_{ow} (log $K_{o}w < 4$).

Mobility in soil:

Because of its high volatility, the product is unlikely to cause ground or water pollution.

PBT and vPvB assessment:

Not classified as PBT or vPvB.

13 DISPOSAL CONSIDERATIONS

Disposal Methods:

Do not attempt to dispose of residual or unused quantities. Return container to supplier. Before transporting container ensure they are firmly secured and ensure cylinder valve is closed and not leaking, valve outlet cap nut or plug (where provided) is correctly fitted, valve protect device (where provided) is correctly fitted.

1.

14 TRANSPORT INFORMATION

Classified as Dangerous Goods for Transport within Australia by Road and Rail according to the criteria of ADG 7.7

	Land Transport (ADG 7.7)	**Sea Transport (IMDG)***
UN Number	1040	1040
UN proper shipping name	Ethylene oxide	Ethylene oxide
Transport Hazard Class	2.3 (2.1)	2.3
Packaging Group	None assigned	None assigned
Marine Pollutant		No

'* Consult IMDG Code for sea transport port provisions and instructions

Environmental hazards for transport purposes	Classified as Aquatic chronic hazard category 2 – toxic to aquatic life with long lasting effects. Not a marine pollutant.

Special Precautions for User:	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted..
Hazchem Code:	2PE

15 REGULATORY INFORMATION

Poison Scheduling:	Schedule 7
APVMA Registration No:	68501

16 OTHER RELEVANT INFORMATION

This product is for use by authorised or licensed persons only.

Glossary:

ADG	Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.5, 2017
AS/NZS	Australian Standard/New Zealand Standard
BCF:	**Bioconcentration Factor -** a measure for the characterization of the accumulation of a chemical in an organism. It is defined as the concentration of a chemical in an organism (plants, microorganisms, animals) divided by the concentration in a reference compartment (e.g. food, surrounding water).
CAS Number:	Unique Chemical Abstracts Service Registry Number
EC_{50}:	Ecotoxic Concentration 50% – concentration in water which is fatal to 50% of a test population (e.g. daphnia, fish species).
ErC_{50}	The concentration of test substance which results in a 50 percent reduction in growth rate.
Explosive Limits:	The range of concentrations (% by volume in air) of a flammable gas or vapour that can result in an explosion for ignition in a confined space.
GHS:	Globally Harmonized System of classification and labelling of chemicals (GHS)
Hazchem Code:	Emergency action code of numbers and letters that provide information to emergency services, especially fire fighters
HCIS:	Hazardous Chemical Information System (http://hcis.safeworkaustralia.gov.au/HazardousChemical)
IARC:	International Agency for Research on Cancer
IDLH:	Immediately dangerous to life or health (**IDLH**) is **defined** by the US National Institute for Occupational Safety and Health (NIOSH)
K_{oc}	The organic carbon partition coefficient (mL soil water /g organic carbon)**.**

LC_{50}:	Lethal Concentration 50% – concentration in air which is fatal to 50% of a test population.
LC_{50}	The dose of a chemical that will kill 50% of the test animals receiving it.
NTP:	National Toxicology Program (USA)
pH:	Measure of how acidic or alkaline a material is using a 1 - 14 scale. pH 1 is strongly acidic and pH 14 strongly alkaline
P_{ow}:	The octanol-water partition coefficient. Commonly used to indicate potential the fate of chemicals in the environment
SDS:	Safety Data Sheet
STEL:	Short term exposure limit (STEL) means the time-weighted average maximum airborne concentration of a substance calculated over a 15 minute period.
SWA:	Safe Work Australia.
TWA:	8-hour Time-weighted average (TWA) means the maximum average airborne concentration of a substance when calculated over an eight-hour working day, for a five-day working week.
WES:	Workplace exposure standard
UN Number:	United Nations Dangerous Goods Number

References:
Work Safe Australia Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice (2020). The exposure standards comply with the Australian Workplace Exposure Standards for Airborne Contaminants. The Dangerous Goods Classification complies with the Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.7, 2020. Other information from Work Safe Australia HSIS database, ChemIDPlus and linked databases and the European Chemicals Agency Classification and Labelling database. Component SDSs.

Date Prepared:	14 December 2021
Replaces:	10 December 2016
Sections Revised:	All

Disclaimer:
This Safety Data Sheet (SDS) has been prepared in compliance with the Work Safe Australia Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice). The information in this SDS should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Tec Gas Pty Ltd. shall not be held liable for any damage resulting from handling or from contact with the above product.