

Section 1 - Identification of The Material and Supplier

Ensystex Australasia Pty Ltd
Unit 3, The Junction Estate
AUBURN, NSW 2144
13 35 36 (all hours)

Ensystex New Zealand Ltd
17C Corinthian Drive
Albany, 0752 Auckland
0800 ENSYTEX (0800 367 978)

Chemical nature: Sulfuryl fluoride.
APVMA Code: 89677
Trade Name: ZYTHOR® Gas Fumigant
Product Use: Fumigant for the control of pests as indicated on the registered label.
For use by licensed fumigators only.
Creation Date: January 2018
This version issued: September 2021 and is valid for 5 years from this date.

**Poisons Information Centre: Phone 13 11 26 in Australia,
0800 764 766 in New Zealand**

Section 2 - Hazards Identification**Statement of Hazardous Nature**

This product is classified as: Xn, Harmful. T, Toxic. N, Dangerous to the environment. Hazardous according to the criteria of SWA.

Dangerous according to Australian Dangerous Goods (ADG) Code, IATA and IMDG/IMSBC criteria.

SUSMP Classification: Schedule 6.

ADG Classification: Class 2.3: Poisonous gases.

UN Number: 2191, SULFURYL FLUORIDE

**GHS Signal word: DANGER****HAZARD STATEMENT:**

- H280: Contains gas under pressure; may explode if heated.
- H301: Toxic if swallowed.
- H330: Fatal if inhaled.
- H370: Causes damage to organs.
- H373: May cause damage to organs through prolonged or repeated exposure.
- H400: Very toxic to aquatic life.

PREVENTION

- P102: Keep out of reach of children.
- P260: Do not breathe fumes, mists, vapours or spray.
- P262: Do not get in eyes, on skin, or on clothing.
- P264: Wash contacted areas thoroughly after handling.
- P270: Do not eat, drink or smoke when using this product.
- P271: Use only outdoors or in a well-ventilated area.
- P273: Avoid release to the environment.
- P280: Wear protective clothing and eye or face protection. DO NOT wear gloves or rubber boots.

RESPONSE

- P311: Call a POISON CENTRE or doctor.
- P314: Get medical advice or attention if you feel unwell.
- P362: Take off contaminated clothing and wash before reuse.
- P301+P310+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTRE, doctor, or emergency facility.
- P302+P352: IF ON SKIN: Wash with plenty of soap and water.

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P304+P310+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTRE, doctor, or emergency facility.

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

P332+P313: If skin irritation occurs: Get medical advice.

P337+P313: If eye irritation persists: Get medical advice.

P370+P378: In case of fire, use carbon dioxide, dry chemical, foam, water fog. Water fog or fine spray is the preferred medium for large fires.

STORAGE

P405: Store locked up.

P410: Protect from sunlight.

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

DISPOSAL

P501: Empty cylinders MUST be returned to your supplier. DO NOT use cylinders for any other purpose.

Follow proper cylinder handling directions. Cylinders remain the property of Ensystex. (See Section 13 of this SDS).

Emergency Overview

Physical Description & colour: Colourless gas.

Odour: No odour.

Major Health Hazards: Direct contact with liquid may cause irreversible freeze burns. Colourless, odourless compressed gas. Evacuate immediate area if leak occurs. Excessive vapour concentrations are attainable and a single exposure may cause death. Toxic to pets, fish, wildlife, and avian.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc. %	TWA (mg/m ³)	STEL (mg/m ³)
Sulfuryl fluoride	2699-79-8	99.8	21	42

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non-hazardous ingredients are also possible.

The SWA TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5-day working week. The STEL (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

In all cases of overexposure, when symptoms such as nausea, difficulty in breathing, abdominal pain, slowing of movements and speech, or numbness in extremities are exhibited, get medical attention immediately. Call the Poisons Information Centre 13 11 26 from anywhere in Australia, 0800 764 766 in New Zealand, or a doctor immediately for treatment advice.

Take person to a doctor or emergency treatment facility.

Description of first-aid measures

General advice: First-Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists, refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call 000 (111 in New Zealand) or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Excessive exposure may severely irritate upper respiratory tract. If breathing is difficult, oxygen should be administered by qualified personnel. If the person is not breathing and has no pulse, consider cardiopulmonary resuscitation (CPR); use pocket resuscitation mask, bag valve mask etc., to avoid risk of poisoning rescuer. To prevent pulmonary oedema, have the person inhale 5 shots of an aerosol corticosteroid metered dose inhaler (if available), such as beclomethasone or fluticasone, etc., every 10 minutes until the person is evaluated by a doctor. Consult a doctor in all cases.

Eye Contact: Hold eye open and rinse slowly and gently with water for at least 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Liquid fumigant in the eye may cause damage due to refrigeration or freezing.

Skin Contact: Immediately apply water to contaminated area of clothing before removing. Once area has thawed, remove contaminated clothing, shoes and other items covering skin. Rinse skin immediately with plenty of water for 15-20 minutes.

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Ingestion: Call the Poisons Information Centre 13 11 26 in Australia, 0800 764 766 in New Zealand, or a doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the Poisons Information Centre. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed: Aside from the information found under description of first aid measures above, and indication of immediate medical attention and special treatment needed below, any additional important symptoms and effects are described in Section: 11 Toxicology Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician: Maintain adequate ventilation and oxygenation of the patient. Sulfuryl fluoride is a gas that has no warning properties such as odour, colour or eye irritation. The prediction of possible human effects is based in part on observations made on laboratory animals.

Treat for frostbite if present with gentle rewarming by water irrigation for at least 15 minutes. It is predicted that persons exposed to sulfuryl fluoride will show little evidence of intoxication at first, unless the concentration is very high (greater than 400 ppm).

Early symptoms of exposure to sulfuryl fluoride are respiratory irritation and central nervous system depression. Excitation may follow. Slowed movement reduced awareness, and slow or garbled speech may be noted. It is essential to keep such an individual at bed rest for at least 24 hours.

Clinical observation should be directed at the pulmonary, hepatic, and renal systems. Prolonged exposure can produce lung irritation, pulmonary oedema, nausea, and abdominal pain. Repeated exposure to high concentrations can result in significant lung and kidney damage.

Convulsions may ensue with respiratory arrest being the terminal event. Assisted respiration may be necessary. Clinical observation is essential.

There is no known antidote for overexposure to sulfuryl fluoride. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. Respiratory symptoms, including pulmonary oedema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Consider administering a complete aerosol corticosteroid metered dose inhaler (100-150 shots) or equivalent as initial preventive treatment for incipient pulmonary oedema. Consider administering 250-1000 mg prednisolone IV on the first day of treatment. Treat for frostbite if present, no specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have this Safety Data Sheet, and if available, the label with you when calling a Poison Information Centre or doctor or going for treatment. Excessive exposure may aggravate pre-existing asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: Cylinders exposed to fire may vent and release toxic gas through melted fusible plugs on cylinders. Although sulfuryl fluoride is not combustible, in temperatures exceeding 400 °C, it will degrade to form hydrogen fluoride and sulphur dioxide.

Extinguishing Media: This product does not burn. All means of extinguishing are acceptable. If cylinders are in a fire area, remove them if possible. Alternately, water can be used to keep them cool to prevent discharge of product due to the melting of fusible plugs in the cylinder valves which will occur at temperatures above 70 °C. Use of water may also help to scrub out part of any hydrofluoric acid and sulphur dioxide which may be formed by decomposition of the product in a fire.

Fire Fighting: Wear positive-pressure, self-contained breathing apparatus and full protective clothing. When fighting fires in atmospheres containing potentially high concentrations of sulfuryl fluoride, encapsulating protective suits should be worn due to possible formation of hydrofluoric acid. Protective suit material should be compatible with exposure to hydrofluoric acid.

Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases can accumulate. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discolouration of container. Move container from fire area if this is possible without hazard. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the Accidental Release Measures and the Ecological Information sections of this SDS.

Flash point: Not combustible.

Upper Flammability Limit: Not combustible.

Autoignition temperature: Not combustible.

Lower Flammability Limit: Not combustible.

Flammability Class: Not combustible.

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Section 6 - Accidental Release Measures

Accidental release: Evacuate immediate area of leak. Use an approved positive pressure self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator for entry into affected areas to correct problem. Move leaking or damaged cylinder outdoors or to an isolated location, observing strict safety precautions. Work upwind if possible. Do not permit entry into leakage area by unprotected persons until concentration of fumigant is determined to be 1 ppm or less, as determined by an approved detection device with sufficient sensitivity. Prevent from entering into soil, ditches, sewers, waterways and /or groundwater.

Section 7 - Handling and Storage

Keep out of reach of children. Do not breathe gas. Keep all unnecessary people and pets out of area containing sulfuryl fluoride gas.

Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures, and make sure that those measures are followed.

The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: Store in a dry, cool, well-ventilated, secure and locked area. Storing indoors in occupied areas in buildings is not recommended. ZYTHOR cylinders are under pressure and must not be stored near heat or open flame.

Exposure to temperatures above 70° C will cause a fusible plug to melt and the contents will be released.

Store cylinders upright; secured to a rack or wall to prevent tipping. Cylinders should not be subjected to rough handling or mechanical shock such as dropping, bumping, or dragging. Do not store near food, feedstuffs, fertilisers or seed.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

SWA Exposure Limits	TWA (ppm)	STEL (ppm)
Sulfuryl fluoride	5	10

The ADI for sulfuryl fluoride is set at 0.05 mg/kg/day. The corresponding NOEL is set at 5 mg/kg/day. ADI means Acceptable Daily Intake; NOEL means No-observable-effect-level. Data from Australian ADI List, June 2014.

No special equipment is usually needed when moving or transporting cylinders. The following instructions are for conditions where a potential for exposure exists.

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Lethal concentrations may exist in areas with poor ventilation. This product should only be used in a well-ventilated area. If natural ventilation is inadequate, use of a fan is suggested.

Eye Protection: Wear splash resistant goggles or full-face shield when handling the liquid product during introduction of fumigant or when working around any lines containing fumigant under pressure. Failure to protect your eyes may lead to severe harm to them or to general health. Emergency eye wash facilities must also be available in an area close to where this product is being used.

Skin Protection: No skin protection should be needed. Skin contact with the liquid may cause freeze damage if the liquid is confined to the skin. Do not wear gloves or rubber boots. Wear a loose fitting or well-ventilated long-sleeve shirt, long pants, shoes and socks.

Do not reuse clothing or shoes that have become contaminated with liquid ZYTHOR until thoroughly aerated.

Protective Material Types: There is no specific recommendation for any particular protective material type.

Respirator: Fatal if inhaled. Do not inhale vapour. If required to enter into a fumigated area, an approved positive pressure self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator must be worn until the concentration of ZYTHOR is confirmed not to exceed 3 ppm with an approved detection device.

Eyebaths or eyewash stations and safety deluge showers should, if practical, be provided near to where this product is being handled commercially.

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Section 9 - Physical and Chemical Properties:

Physical Description & colour:	Colourless gas.
Odour:	No odour.
Boiling Point:	-55.4 °C at 100 kPa
Freezing/Melting Point:	No specific data. Gas under pressure at normal temperatures.
Volatiles:	No data.
Vapour Pressure:	1520 kPa at 20 °C.
Vapour Density:	4.3 g/L at 20 °C.
Specific Gravity:	1.35 at 20 °C.
Water Solubility:	Practically insoluble.
Decomposition temp:	400 °C.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Conditions to Avoid: Avoid heating product to its decomposition temperature.

Incompatibilities: Strong bases.

Fire Decomposition: Hydrogen fluoride and sulphur dioxide upon heating above decomposition temperature.

Polymerisation: This product will not undergo polymerisation reactions.

Section 11 - Toxicological Information

Acute Toxicity: Inhalation LC₅₀ Rat 991 ppm. Oral LD₅₀ Rat 100 mg/kg.

Irritation: Reacts with mucous membranes

Chronic Toxicity: Inhalation, after repeated exposure, various species,

Skin corrosion/irritation

Essentially non-irritating to skin. Liquid may cause frostbite upon skin contact.

Serious eye damage/eye irritation

No hazard from gas. Liquid may cause frostbite.

Inhalation

Vapour concentrations are attainable which may be fatal with single exposure. Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs. The LC₅₀ for a 4-hour exposure for rats is 991 ppm.

Target organs: Brain, central nervous system, kidney, lung, respiratory tract and thyroid gland. Observations in animals include convulsions and tremors. May cause fluorosis of teeth and bones.

Single exposure:

Causes damage to organs.

Route of exposure: Inhalation, Target Organs: Kidney

Repeated exposure:

In animals, effects have been reported on the following organs: Central nervous system, Kidney, Lung, Respiratory tract, Thyroid. Observations in animals include: Convulsions, Tremors. May cause fluorosis of teeth and bones

No teratogenic effect

No carcinogenic effects

No reproductive toxicity effects

No mutagenic effects

Classification of Hazardous Ingredients

Ingredient	Risk Phrases
Sulfuryl Fluoride	Conc.>=25%: T; R23; R48/20

Potential Health Effects

Inhalation:

Short term exposure: This product is fatal. In addition, product may be irritating. Vapour concentrations are attainable which may be fatal with single exposure. Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs.

Long Term exposure: No data for health effects associated with long term inhalation.

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Skin Contact:

Short term exposure: Direct contact with liquid may cause irreversible freeze burns on exposed skin.

Long Term exposure: No data for health effects associated with long term skin exposure.

Eye Contact:

Short term exposure: Direct contact with liquid may cause irreversible freeze burns to eyes.

Long Term exposure: No data for health effects associated with long term eye exposure.

Ingestion:

Short term exposure: Moderately toxic though significant oral exposure is considered to be unlikely due to the physical state of the product. Product may be irritating to mucous membranes.

Long Term exposure: No data for health effects associated with long term ingestion.

Carcinogen Status:

SWA: No significant ingredient is classified as carcinogenic by SWA.

NTP: No significant ingredient is classified as carcinogenic by NTP.

IARC: No significant ingredient is classified as carcinogenic by IARC.

Section 12 - Ecological Information

This product is very toxic to aquatic organisms. This product will not accumulate in the soil or water or cause long term problems.

Toxicity**Acute toxicity to fish:**

LC₅₀, *Danio rerio* (zebra fish), static test 96 Hour, 0.89 mg/L

Acute toxicity to aquatic invertebrates:

EC₅₀, *Daphnia magna* (water flea), static test, 48 Hour, 0.62 mg/L

Acute toxicity to algae/aquatic plants:

EyC₅₀, *Pseudokirchneriella subcapitata* (green algae), static test, 96 Hour Growth inhibition (cell density reduction), 3.05 mg/L

EbC₅₀, *Pseudokirchneriella subcapitata* (green algae), static test, 72 Hour Biomass, 0.58 mg/L

ErC₅₀, *Pseudokirchneriella subcapitata* (green algae), static test, 72 Hour Growth rate inhibition, 1.13 mg/L

Toxicity to above ground organisms:

LC₅₀, *Apis mellifera* (bees), 2-hour, mortality, 6.5 mg/L

LC₅₀, *Colinus virginianus* (bobwhite quail), 4-hour, 1,844 ppm.

Persistence and degradability:

Biodegradability: Chemical degradation (hydrolysis) is expected in the environment.

Bioaccumulative potential:

Bioaccumulation: Bioconcentration potential is low (BCF<100 or Log Pow<3)

Mobility in soil:

Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient (Koc): 6 Estimated

Other effects: Product is known to have herbicide and insecticide properties

Section 13 - Disposal Considerations

Disposal: Empty cylinders MUST be returned to Ensystex. DO NOT use cylinders for any other purpose. Follow proper cylinder handling directions. Cylinders remain the property of Ensystex.

Section 14 - Transport Information

Dangerous according to Australian Dangerous Goods (ADG) Code, IATA and IMDG/IMSBC criteria.

UN Number: 2191, SULPHURYL FLUORIDE

Hazchem Code: 2XE

Special Provisions: None allocated

Limited quantities: ADG 7 specifies a Limited Quantity value of NONE for this class of product.

Dangerous Goods Class: Class 2.3: Poisonous gases.

Packaging Group: No packing group specified.

Packaging Method: P200

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Class 2.3 Toxic Gases shall not be loaded in the same vehicle or packed in the same freight container with Classes 1 (Explosives), 3 (Flammable Liquids), 4.2 (Spontaneously Combustible Substances), 5.1 (Oxidising Agents), 5.2 (Organic Peroxides), Foodstuffs and foodstuff empties. They may however be loaded in the same vehicle or packed in the same freight container with Classes 2.1 (Flammable Gases), 2.2 (Non-Flammable, Non-Toxic Gases), 4.1 (Flammable Solids), 4.3 (Dangerous When Wet Substances), 6 (Toxic Substances), 7 (Radioactive Substances), 8 (Corrosive Substances) 9 (Miscellaneous Dangerous Goods).

Do not transport cylinders in closed vehicles where the same common airspace is occupied by personnel. On public roads transport only when secured in an upright position.

Do not use rope slings, hooks, tongs, or similar devices to unload cylinders.

Do not remove the valve protection bonnet and safety cap until immediately before use.

When cylinder is empty, close valve, screw safety cap onto valve outlet, and replace protection bonnet before returning to supplier. ZYTHOR cylinders must never be transported by aircraft under any circumstances.

DOT Non-Bulk

Proper Shipping Name: SULFURYL FLUORIDE

Hazard Class: 2.3 ID Number: UN2191

DOT Bulk

Proper Shipping Name: SULFURYL FLUORIDE

Hazard Class: 2.3 ID Number: UN2191

IMDG

Proper Shipping Name: SULFURYL FLUORIDE

Hazard Class: 2.3 ID Number: UN2191

EMS Number: F-C, S-U

Marine pollutant: Yes

IATA

Forbidden on both passenger and cargo aircraft due to inhalation hazard.

Marine pollutant

Poison - inhalation hazard, Zone D

Section 15 - Regulatory Information

AICS: This product is compliant with NICNAS regulations.

The following ingredient: Sulfuryl fluoride, is mentioned in the SUSMP.

Section 16 - Other Information

This SDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7 th edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially firefighters
IARC	International Agency for Research on Cancer
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS SDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS. OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.

Please read all labels carefully before using product.

SAFETY DATA SHEET