

Information on ProFume® gas fumigant

For Fire Departments, Hazardous Materials Crews and other Emergency Response Teams

In case of an emergency endangering life or property involving ProFume® gas fumigant, call
Dow AgroSciences LLC at 1-800-992-5994.

1. INTRODUCTION:

ProFume® gas fumigant was developed by Dow AgroSciences as a postharvest fumigant for control of stored product pests. ProFume is currently labeled for control of beetles, moths, weevils and rodents, infesting buildings, storage structures, warehouses, and stationary transportation vehicles (not including aircraft or passenger railcars). ProFume is registered by the EPA under registration number 62719-376. ProFume is a RESTRICTED USE PESTICIDE.

2. SULFURYL FLUORIDE PHYSICAL PROPERTIES:

ProFume® gas fumigant is an inorganic chemical composed of 99.8% sulfuryl fluoride CAS# 002699-79-8 and 0.2% inert ingredients. Sulfuryl fluoride has the following physical properties:

- COLOR AND ODOR: None (a slight sulfur odor which may be detected at high concentrations of sulfuryl fluoride is caused by inert ingredients).
- MOLECULAR WEIGHT: 102
- VAPOR DENSITY: Sulfuryl fluoride is approximately 3.5 times heavier than air.
- BOILING POINT: -67°F; sulfuryl fluoride is a gaseous state under normal environmental conditions.
- GAS SOLUBILITY: (77°F, 1 ATM): 750 PPM by weight in water which is in equilibrium with air saturated with sulfuryl fluoride. Sulfuryl fluoride is relatively non-reactive as a gas.
- FLASH POINT: Not combustible; Temperatures exceeding 752°F (400°C) will cause sulfuryl fluoride to decompose to form hydrogen fluoride and sulfur dioxide.

3. DERMAL TOXICITY:

Sulfuryl fluoride, the active ingredient in ProFume® gas fumigant, has low lipid solubility and *is essentially nonirritating to skin*. Laboratory studies have demonstrated no ill effects in animals after dermal exposure to ProFume as a gas. In handbooks on hazardous materials, sulfuryl fluoride is often classified with sulfuric acid or hydrofluoric acid and is inaccurately described as causing severe acid burns to skin. ProFume as either liquid or gas has not been documented to cause acid burns to skin. However, liquid ProFume contacting eyes or skin may cause freeze injury as it rapidly evaporates.

4. INHALATION TOXICITY:

Inhalation is the critical route of exposure to sulfuryl fluoride, an odorless, toxic gas. The initial concentration of ProFume® gas fumigant introduced into structures for stored product pest control can be less than 1 pound/1000 cubic feet (3850 ppm) to a maximum target concentration of 8 pounds/1000 cubic feet (30,800 ppm).

ACUTE INHALATION:

LC₅₀ values for laboratory rats exposed to various concentrations of ProFume for fixed time periods.

Gender	Exposure time (hr)	LC ₅₀ (ppm)	Time to incapacitation of rats exposed to various concentrations of ProFume ¹	
			ppm	Time (minutes)
male	4	1122	4,000	42
female	4	991	10,000	16
male	1	3730	20,000	10
female	1	3021	40,000	6

¹These exposures produced 100% mortality: all rats were dead or moribund within three hours after the end of the exposure.

SUBCHRONIC INHALATION: In 13-week studies, rats exposed six hours/day, five days/week to 30 ppm ProFume showed no adverse effects. A concentration of 100 ppm produced no significant effects other than mottled teeth.

The current TLV and STEL for sulfuryl fluoride are:

- ACGIH TLV and OSHA PEL: 5 ppm for eight hours/day, five days/week for the life of a working individual.
- STEL (Short-term exposure limit) (ACGIH): 10 ppm (15 minute time-weighted average).

REPRODUCTIVE STUDY: There were no treatment related effects on reproductive or fertility indices, reproductive organs or offspring survival in test animals from a two generation exposure to 150 ppm of sulfuryl fluoride.

TERATOLOGY STUDY: There were no teratological effects on rats or rabbits at the highest dose of sulfuryl fluoride tested: 225 ppm.

GENOTOXICOLOGICAL STUDY: While some *in vitro* studies gave positive results consistent with exposure to fluoride ions, the available *in vivo* data for sulfuryl fluoride indicate no mutagenic or carcinogenic potential.

5. PROTECTIVE EQUIPMENT:

EYE PROTECTION: Fumigators are required to wear a face shield or splash resistant goggles when releasing ProFume® gas fumigant from the cylinder. *This is to prevent freeze damage to the eye by liquid contact.*

PROTECTIVE CLOTHING: *Skin contact with the liquid may cause freeze damage if the liquid is confined to the skin. Rubber gloves can confine liquid to the skin, and should not be used by fumigators when releasing ProFume from the cylinder. After ProFume is released and is in the gas form dermal exposure does not pose a significant risk of injury. Wear loose fitting or well ventilated long-sleeve shirt, long pants, shoes and socks.*

RESPIRATORY PROTECTION: Fumigators are required to wear a NIOSH or MSHA approved (TC-19C), positive-pressure self-contained breathing apparatus (SCBA) when entering areas where concentrations of ProFume are unknown or exceed 1 ppm. Fumigators are also required to use an approved low concentration clearance device to confirm concentrations of ProFume of 1 ppm or less before permitting reoccupation of structures after fumigation.

The Interscan is the most commonly used clearance detector by fumigators using ProFume (detection range for sulfuryl fluoride 0-50 ppm). The Interscan operates by drawing an air sample through a furnace, which converts sulfuryl fluoride to sulfur dioxide (SO₂). The SO₂ is passed through an SO₂ sensor; the sensor output is registered on a direct-reading dial as ppm sulfuryl fluoride. The Interscan requires monthly calibration to ensure accurate readings. The unit is manufactured by Interscan Corporation, 21700 Nordhoff Street, P.O. Box 2496, Chatsworth, CA 91311, 818-882-2331 or 800-458-6153.

6. FIRST AID TREATMENT:

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. Take person to a doctor or emergency treatment facility.

IF INHALED: Humans exposed to high concentrations (>1000 ppm) of ProFume® gas fumigant may experience any of the following symptoms: respiratory irritation, nausea, abdominal pain, central nervous system (CNS) depression, slow or garbled speech, slow body movements, numbness of extremities, dulling of awareness.

Survival of humans exposed to ProFume is dependent upon the concentration of ProFume and the duration of exposure. Humans can survive exposure to high concentrations of ProFume, even following convulsions, if the exposure was brief. If a person potentially exposed to ProFume shows any of the above symptoms or unusual behavior, you should:

- Immediately take the individual to fresh uncontaminated air and keep him at rest.
- Help the individual maintain body temperature.
- Check breathing and heartbeat.
 - If breathing stops, start artificial respiration.
 - If breathing is difficult, give oxygen.
 - If heartbeat stops, start cardiopulmonary resuscitation.
- Immediately have someone obtain medical assistance, or transport the affected individual to a medical facility and notify ahead that emergency medical treatment will be needed.

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF ON SKIN: If ProFume is projected onto a small area of the skin, wash the area with water. Any damage to the skin would result from freezing, not from acid burns. If clothing gets wet with liquid ProFume, immediately remove the clothing from skin contact and aerate.

7. INFORMATION FOR PHYSICIANS:

The prediction of possible effects of exposure to ProFume® gas fumigant on human beings is based in part on observations of laboratory animals. On this basis, people exposed to ProFume will probably show little evidence of intoxication at first, unless the concentration was >400 ppm. CNS depression with slow speech and gait will generally be the first symptoms noted.

There is no known antidote for overexposure to ProFume. Keep individuals overexposed to ProFume at bed rest for at least 24 hours. Clinical observations are essential and should be directed at pulmonary, hepatic, and renal systems. Treatment is based on the clinical judgment of the physician and the individual reaction of the patient. A post mortem finding in one fatality attributed to sulfuryl fluoride (a residential fumigation using Vikane® gas fumigant) was pulmonary edema, with death attributed to cardiorespiratory failure. Convulsions may ensue with respiratory arrest being the terminal event. Assisted respiration may be necessary.

8. FIRE FIGHTING:

GENERAL INFORMATION: ProFume® gas fumigant is not combustible. However, in temperatures exceeding approximately 752°F (400°C), ProFume will degrade to form hydrogen fluoride (HF) and sulfur dioxide. Theoretically, the number of oz of HF/1000 cubic feet produced during a fire in a structure containing ProFume would equal 0.4 x number of ounces ProFume /1000 cubic feet². *Nonetheless, amounts of HF actually produced during fires involving ProFume may be insignificant because ProFume rapidly dissipates when not confined.*

²In temperatures exceeding approximately 752°F (400°C), each mole (102 gm) of sulfuryl fluoride will degrade to form 2 moles (40 gm) of hydrogen fluoride (HF).

CYLINDERS OF ProFume: ProFume is packaged as a gas under pressure in cylinders, thus cylinders contain both gas and liquid. Sulfuryl fluoride and the 0.2% inert ingredients are non-flammable.

USE OF WATER: Evolution of hazardous materials during a fire can be minimized by use of water. Water will scrub out part of the HF and SO₂ formed by decomposition of ProFume gas fumigant in the flame. Water also can be used to cool cylinders of ProFume and prevent discharge of the product. Avoid runoff into waterways if possible. The toxicity of ProFume in water for fish is unknown.

PROTECTIVE CLOTHING (for fires involving cylinders of ProFume): Self-contained breathing apparatus and NFPA approved flash encapsulating protective suits should be worn when fighting fires in atmospheres containing potentially high concentrations of ProFume. Protective suit material should be compatible with exposure to hydrofluoric acid.

9. FIRES IN STRUCTURES UNDER FUMIGATION WITH PROFUME:

The label for ProFume[®] gas fumigant requires the fumigant to be released from outside the area to be fumigated. Therefore, it is very unlikely a cylinder of ProFume will be found inside a structure under fumigation.

WARNING SIGNS: By Federal law, a warning sign must be placed at all entrances and on all sides of the structure under fumigation. Some state laws require additional placarding. The signs must contain information including the accepted common name of the fumigant, and the name, address, and day and night telephone numbers of the company performing the fumigation.

FANS: The label for ProFume requires the use of electric fans to provide forced air circulation for facilitating rapid dispersion of the fumigant during introduction of the fumigant.

WARNING AGENT: No warning agent is added to or used with ProFume gas fumigant.

PROTECTIVE CLOTHING (for fires involving cylinders of ProFume): Self-contained breathing apparatus and NFPA approved flash encapsulating protective suits should be worn when fighting fires in atmospheres containing potentially high concentrations of ProFume. Protective suit material should be compatible with exposure to hydrofluoric acid.

10. PACKAGING AND DISTRIBUTION OF PROFUME:

ProFume[®] gas fumigant is packaged for fumigators in a standardized compressed gas container: a white, steel tank 4 ft long and 10 inches in diameter. Each single wall cylinder contains 125 lbs. of 99.8% pure sulfuryl fluoride. No additional gas is used to pressurize the cylinder. Each *full* cylinder contains 200-300 pounds of pressure per square inch. (See the table below for range of pressures for various temperatures.)

Temperature		Pressure (PSIA) ³	Temperature		Pressure (PSIA) ³
°F	°C		°F	°C	
0	-17.8	71	80	26.7	264
10	-12.2	86	90	32.2	303
20	-6.7	103	100	37.8	346
30	-1.1	123	110	43.3	393
40	4.4	145	120	48.9	445
50	10.0	170	130	54.4	550
60	15.6	198	140	60.0	635
70	21.1	229	150	65.6	730

³Pounds per Square Inch Absolute

ProFume is made and packaged only by Dow AgroSciences at one location in California. No other repackaging is permitted. Cylinders of ProFume, 12 to a pallet, are transported via truck or shipped to distribution centers in the continental U.S. and Hawaii. ProFume gas fumigant is not transported in bulk by railcar. These cylinder valves are equipped with a 1.030" right hand thread, 14 threads per inch, straight thread fitting for connecting introduction fittings. This is comparable to a ¾" pipefitting (pipefitting is not the same as a hose fitting).

11. DEALING WITH LEAKS INVOLVING PROFUME:

If you believe a cylinder may be leaking ProFume[®] gas fumigant, immediately clear the area (100'). Use a NIOSH or MSHA approved positive pressure self-contained breathing apparatus (SCBA, not SCUBA) or combination air-supplied/SCBA respirator, such as manufactured by Ranger, Survivair, Scott, or MSA, 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 part per million (ppm) or less, as determined by a detection device with sufficient sensitivity such as an INTERSCAN gas analyzer [Model: GF 1900] or MIRAN vapor analyzer [SapPhIRe].



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ProFume is a federally Restricted Use Pesticide.
Vikane is a federally Restricted Use Pesticide.
Always read and follow label directions.