

Sodium fluoroacetate

sc-251024

Material Safety Data Sheet



The Power is Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Sodium fluoroacetate

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
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800.457.3801 or 831.457.3800

EMERGENCY:

ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C2-H2-F-O2.Na, "acetic acid, fluoro-, sodium salt", "compound no. 1080", "fluoroacetic acid, sodium salt", "sodium fluoroacetate de", "sodium monofluoroacetate", "sodio, fluoroacetato di", "sodium fluoacetate", "sodium fluoacetic acid", "sodium fluoracetate", "Fluorakil 3", Fluoressigaeure, "Fluorocetan sodny", Fratol, Furatol, "Latka 1080", "Monofluoressigsaures natrium", Natriumfluoracetaat, Natriumfluoracetat, "Ratbane 1080", "TL 869", Yasoknock, "RCRA waste number P058", "rabbit poison"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

| | Min | Max | |
|---------------|-----|-----|--|
| Flammability: | 1 | | |
| Toxicity: | 4 | | |
| Body Contact: | 4 | | |
| Reactivity: | 1 | | |
| Chronic: | 2 | | |

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Very toxic by inhalation, in contact with skin and if swallowed.

Very toxic to aquatic organisms.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Severely toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 5 gram may be fatal or may produce serious damage to the health of the individual.

■ The lethal dose of fluoroacetate in humans is 2-10 mg/kg. It is easily absorbed from the digestive system but symptoms of poisoning are delayed for up to a few hours. Their onset is usually insidious, and they include apprehension, auditory hallucinations, tingling sensation of the nose, facial twitching and numbness, and other central nervous system effects. Heart failure and depression of breathing and the vasomotor system can cause death.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

■ Skin contact with the material may produce severely toxic effects; systemic effects may result following absorption and these may be fatal.

■ The material is not thought to be a skin irritant (as classified using animal models). Abrasive damage however, may result from prolonged exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

■ May be toxic if absorbed through the skin.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normal handling, may produce severely toxic effects; these may be fatal.

■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

■ Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

In general, alpha-halocarboxylic acids and their esters are good alkylating agents and should be handled with care.

Alkylating agents may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in granular leukocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) needs months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Repeated occupational exposure to sodium fluoroacetate has been associated with kidney disease.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|----------------------|---------|-----|
| sodium fluoroacetate | 62-74-8 | >98 |

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise: · For advice, contact a Poisons Information Center or a doctor. · Urgent hospital treatment is likely to be needed. · If conscious, give water to drink. · INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if

possible) to maintain open airway and prevent aspiration. NOTE: Wear a protective glove when inducing vomiting by mechanical means. · In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. · If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist. · If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. · Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes. · Transport to hospital or doctor without delay. · Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

■ If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear. · Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center. · Transport to hospital, or doctor.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. · Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. · Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. · Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

■ For poisonings involving fluoroacetate:

- Induce vomiting immediately if possible.
 - Gastric lavage with tap water unless convulsions/ imminent convulsions make this impracticable.
 - Instill into the stomach sodium or magnesium sulfate in water (15-30 gm).
 - Although the clinical efficacy of monoacetin (glycerol monoacetate) is not established, it should probably be administered if available. The recommended dose is 0.5 ml/kg of undiluted fluid intramuscularly every half-hour for several hours and then at a reduced level for at least 12 hours. In the same dose monoacetin may also be given intravenously after dilution with 5 parts of sterile isotonic saline. No preparation of monoacetin is known to be available on the market. Usual commercial fluid contains free glycerin and assays at 70% at best. even the use of nonsterile preparations must be considered. Injection may be expected to produce some sedation and vasodilation. Intramuscular injection sites must be varied because of local pain and edema. Should parenteral administration be not feasible, the patient may drink a mixture of 100 ml of monoacetin in 500 ml water.
 - If monoacetin is not available, acetamide or ethanol may be given in the same doses.
 - A short-acting barbiturate drug or diazepam may be tried to control convulsions.
 - Oxygen therapy and artificial ventilation as required.
 - It is doubtful that digitalis is ever warranted. Parenteral procainamide or quinidine may be given a therapeutic trial but in experimental poisonings these drugs have proved less successful than monoacetin in controlling cardiac arrhythmias.
 - If possible, monitor the electrocardiogram continuously and secure chest electrodes for external defibrillation if it becomes necessary.
- [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products 5th Ed].

Section 5 - FIRE FIGHTING MEASURES

| | |
|-----------------------------|----------------|
| Vapour Pressure (mmHG): | Not available. |
| Upper Explosive Limit (%): | Not applicable |
| Specific Gravity (water=1): | >1 |
| Lower Explosive Limit (%): | Not applicable |

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen fluoride, other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Full face- shield.

Gloves:

Respirator:

Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

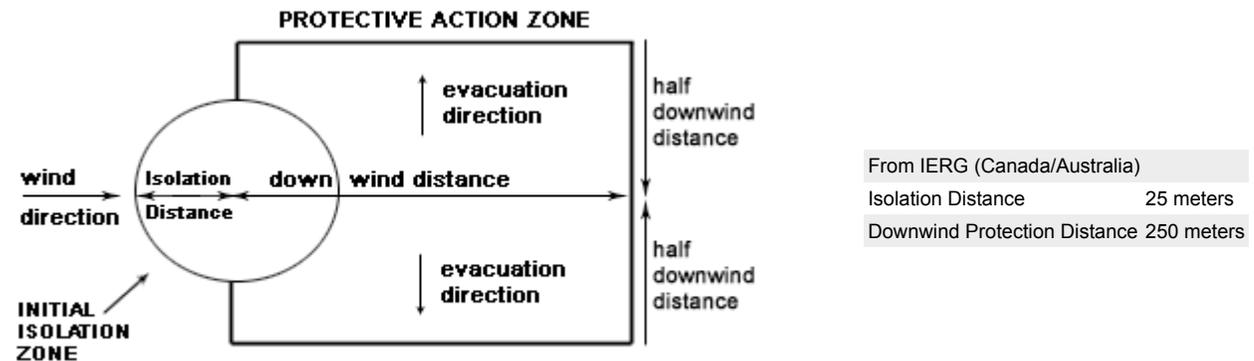
MINOR SPILLS

- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 151 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers.
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- DO NOT use aluminium, galvanised or tin-plated containers.
- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

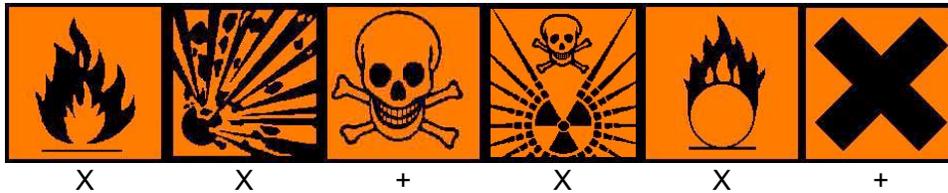
- Removable head packaging;
- Cans with friction closures and
- low pressure tubes and cartridges may be used.- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages * . - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage * . - * unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic.

All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together

O: May be stored together with specific preventions

+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

| Source | Material | TWA ppm | TWA mg/m ³ | STEL ppm | STEL mg/m ³ | Notes |
|--------|----------|---------|-----------------------|----------|------------------------|-------|
| | | | | | | |

| | | | | |
|---|---|------|------|--|
| Canada - Alberta Occupational Exposure Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | |
| Canada - British Columbia Occupational Exposure Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | Skin |
| Canada - Ontario Occupational Exposure Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | Skin |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | |
| US ACGIH Threshold Limit Values (TLV) | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | TLV Basis: central nervous system & cardiac impairment; nausea |
| US NIOSH Recommended Exposure Limits (RELs) | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | [skin] |
| US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | |
| US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| US - Minnesota Permissible Exposure Limits (PELs) | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| US - California Permissible Exposure Limits for Chemical Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| US - Idaho - Limits for Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | |
| US - Hawaii Air Contaminant Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| US - Alaska Limits for Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| US - Michigan Exposure Limits for Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances | sodium fluoroacetate (Sodium fluoroacetate (1080) - Skin) | 0.05 | - | 0.15 |
| US - Washington Permissible exposure limits of air contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | |
| Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 | Skin |
| Canada - Prince Edward Island Occupational Exposure Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | | TLV Basis: central nervous system & cardiac impairment; nausea |

| | | | |
|--|---|------|--|
| US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | |
| Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English) | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | 0.15 |
| US - Oregon Permissible Exposure Limits (Z-1) | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | |
| Canada - Northwest Territories Occupational Exposure Limits (English) | sodium fluoroacetate (Sodium fluoroacetate (1080) - Skin) | 0.05 | 0.15 |
| Canada - Nova Scotia Occupational Exposure Limits | sodium fluoroacetate (Sodium fluoroacetate) | 0.05 | TLV Basis: central nervous system & cardiac impairment; nausea |

ENDOELTABLE

EMERGENCY EXPOSURE LIMITS

Material Revised IDLH Value (mg/m3) Revised IDLH Value (ppm)
sodium fluoroacetate 2.5

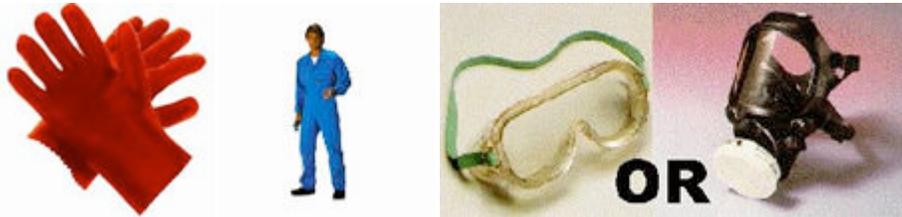
MATERIAL DATA

SODIUM FLUOROACETATE:

■ for sodium fluoroacetate:

Sodium fluoroacetate is highly toxic producing both convulsions and ventricular fibrillation. Systemic toxicity is due inhibition of the citric acid cycle and may result form both inhalation and dermal exposure. The TLV-TWA is thought to be protective against systemic intoxication.

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

- Chemical goggles.
- Full face shield.
- Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET

■ Elbow length PVC gloves.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

RESPIRATOR

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory. These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a

complete respiratory protection program.

- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

RESPIRATOR

| Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|-------------------|----------------------|----------------------|------------------------|
| 10 x PEL | P1 | - | PAPR-P1 |
| | Air-line* | - | - |
| 50 x PEL | Air-line** | P2 | PAPR-P2 |
| 100 x PEL | - | P3 | - |
| | - | Air-line* | - |
| 100+ x PEL | - | Air-line** | PAPR-P3 |

* - Negative pressure demand ** - Continuous flow

Explanation of Respirator Codes:

Class 1 low to medium absorption capacity filters.

Class 2 medium absorption capacity filters.

Class 3 high absorption capacity filters.

PAPR Powered Air Purifying Respirator (positive pressure) cartridge.

Type A for use against certain organic gases and vapors.

Type AX for use against low boiling point organic compounds (less than 65°C).

Type B for use against certain inorganic gases and other acid gases and vapors.

Type E for use against sulfur dioxide and other acid gases and vapors.

Type K for use against ammonia and organic ammonia derivatives

Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.

Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.

Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.

· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

· If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a): particle dust respirators, if necessary, combined with an absorption cartridge;

(b): filter respirators with absorption cartridge or canister of the right type;

(c): fresh-air hoods or masks

· Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.

· Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

| Type of Contaminant: | Air Speed: |
|--|----------------------------------|
| direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 f/min.) |
| grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion). | 2.5-10 m/s (500-2000 f/min.) |
| Within each range the appropriate value depends on: | |
| Lower end of the range | Upper end of the range |
| 1: Room air currents minimal or favorable to capture | 1: Disturbing room air currents |
| 2: Contaminants of low toxicity or of nuisance value only | 2: Contaminants of high toxicity |
| 3: Intermittent, low production. | 3: High production, heavy use |
| 4: Large hood or large air mass in motion | 4: Small hood-local control only |

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Mixes with water.

| | | | |
|---------------------------|------------------|--------------------------------|----------------|
| State | Divided solid | Molecular Weight | 100.03 |
| Melting Range (°F) | 392 (decomposes) | Viscosity | Not Applicable |
| Boiling Range (°F) | Not available. | Solubility in water (g/L) | Miscible |
| Flash Point (°F) | Not Available | pH (1% solution) | >7 |
| Decomposition Temp (°F) | Not Available | pH (as supplied) | Not applicable |
| Autoignition Temp (°F) | Not applicable | Vapour Pressure (mmHG) | Not available. |
| Upper Explosive Limit (%) | Not applicable | Specific Gravity (water=1) | >1 |
| Lower Explosive Limit (%) | Not applicable | Relative Vapor Density (air=1) | Not Applicable |
| Volatile Component (%vol) | Not available. | Evaporation Rate | Not available |

APPEARANCE

Fine, white, powder with a faint vinegar-like odour. May be mixed with marker dye. Soluble in water. Insoluble in most organic solvents.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

- In presence of moisture, the material is corrosive to aluminium, zinc and tin producing highly flammable hydrogen gas.

Avoid strong acids.

Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

SODIUM FLUOROACETATE

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

| TOXICITY | IRRITATION |
|--------------------------------|--------------|
| Oral (human) LDLo: 0.714 mg/kg | Nil Reported |
| Oral (rat) LD50: 0.100 mg/kg | |
| Dermal (rat) LD50: 48 mg/kg | |

■ for fluoroacetate salts:

Fluoroacetate in the mammalian body is converted to fluorocitrate. This compound inhibits the enzyme aconitase, thus blocking the citric acid cycle. This leads to accumulation of citric acid, which may cause convulsions and death from cardiac failure or respiratory arrest.

SKIN

| | | | |
|----------------------|--|------------------|---|
| sodium fluoroacetate | US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin | Skin Designation | X |
| sodium fluoroacetate | US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin | Skin Designation | X |
| sodium fluoroacetate | US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin | Skin Designation | X |
| sodium fluoroacetate | US - Washington Permissible exposure limits of air contaminants - Skin | Skin | X |
| sodium fluoroacetate | US - Minnesota Permissible Exposure Limits (PELs) - Skin | Skin Designation | X |
| sodium fluoroacetate | US - Hawaii Air Contaminant Limits - Skin Designation | Skin Designation | X |

| | | | |
|----------------------|--|-----------------------|---|
| sodium fluoroacetate | US OSHA Permissible Exposure Levels (PELs) - Skin | Skin Designation | X |
| sodium fluoroacetate | Canada - Alberta Occupational Exposure Limits - Skin | Substance Interaction | 1 |

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

SODIUM FLUOROACETATE:

Marine Pollutant: Yes

■ Very toxic to aquatic organisms.

■ Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

■ fluoroacetate inorganic salts:

Environmental fate:

Leaching and metabolism are the major routes of dissipation. However, undegraded fluoroacetate is considered mobile and consequently has a high potential to move downward in the soil and reach ground water. Sodium fluoroacetate appears to degrade primarily by biologically mediated processes. Sodium fluoroacetate appears first to ionise to sodium and fluoroacetate with the fluoroacetate portion further degrading by biologically mediated processes. Microorganisms capable of dehalogenating compounds are reported to metabolise fluoroacetate to fluoride and glycolate faster than other microorganisms. Unvalidated data suggest that sodium fluoroacetate does not degrade substantially in 27 days in sterile soil.

Because there are no leaching adsorption-desorption data, mobility can only be assessed on the basis of solubility in water. Based on solubility in water, undegraded fluoroacetate may tend to leach. However, the potential for leaching may be reduced in some soils by adsorption to organic matter and clay particles and absorption by plants.

Hydrolysis: the stability of sodium monofluoroacetate in water and saline was determined for a period of approximately 6 months. An immediate loss of fluorine was detected in both the water and saline solutions. A progressive loss of fluorine was reported in the water solutions. However, the saline solutions indicated no significant decreases in fluorine content after the initial loss. The following reaction is indicated: $XCH\ COO^- + OH^- = HOCH_2COO^- + X^-$ (where X = F, Cl, or I)

Ecotoxicity:

Very highly toxic to birds:

Avian acute oral LD50: ring-necked pheasant 6.4 mg/kg mallard duck 9.1 mg/kg; chukar 3.51 mg/kg; widgeon 3 mg/kg; golden eagle 5 mg/kg; black vulture 15 mg/kg; magpie 1.78-2.3 mg/kg

Avian subacute dietary LC50: bobwhite quail 486 ppm; mallard duck 231 ppm

Slightly toxic to coldwater fish; practically non-toxic to warm water fish:

Fish LC50 996 h): rainbow trout 54 mg/l; bluegill sunfish >970 mg/l

Practically non-toxic to freshwater invertebrates:

Daphnia EC50 (48 h): 350 mg/l (static)

The chemical is very highly toxic to mammals on an acute oral basis. Certain species may be exposed, primarily as a result of scavenging the carcasses of livestock bearing the sodium fluoroacetate livestock protection collars.

■ DO NOT discharge into sewer or waterways.

Ecotoxicity

| Ingredient | Persistence: Water/Soil | Persistence: Air | Bioaccumulation | Mobility |
|----------------------|-------------------------|------------------|-----------------|----------|
| sodium fluoroacetate | LOW | | LOW | HIGH |

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When sodium fluoroacetate is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number P058 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

- Dispose of by: Burial in a licensed land-fill or Incineration in a licensed apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols: None Hazard class or Division: 6.1

Identification Numbers: UN2629 PG: I

Label Codes: 6.1 Special provisions: IB7, IP1, T6, TP33

Packaging: Exceptions: None Packaging: Non- bulk: 211

Packaging: Exceptions: None Quantity limitations: 5 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 50 kg Vessel stowage: Location: E aircraft only:

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

Sodium fluoroacetate

Air Transport IATA:

ICAO/IATA Class: 6.1 ICAO/IATA Subrisk: None

UN/ID Number: 2629 Packing Group: I

Special provisions: None

Cargo Only

Packing Instructions: 607 Maximum Qty/Pack: 50 kg

Passenger and Cargo Passenger and Cargo

Packing Instructions: 606 Maximum Qty/Pack: 5 kg

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: - Maximum Qty/Pack: -

Shipping Name: SODIUM FLUOROACETATE

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: None

UN Number: 2629 Packing Group: I

EMS Number: F-A , S-A Special provisions: None

Limited Quantities: 0 Marine Pollutant: Yes

Shipping Name: SODIUM FLUOROACETATE

Section 15 - REGULATORY INFORMATION



REGULATIONS

sodium fluoroacetate (CAS: 62-74-8) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Ontario Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Non-Domestic Substances List (NDSL)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "US - Alaska Limits for Air Contaminants", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity", "US - California Proposition 65 - Reproductive Toxicity", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Maine Chemicals of High Concern List", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous Constituents", "US - Vermont Hazardous Waste - Acutely Hazardous Wastes", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Dangerous waste constituents list", "US -

Washington Discarded Chemical Products List - ""P"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGs) - Holding","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 8 (d) - Health and Safety Data Reporting"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Cumulative effects may result following exposure*.
- Limited evidence of a carcinogenic effect*.

* (limited evidence).

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- Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: Nov-3-2009

Print Date: Oct-2-2010