SAFETY DATA SHEET

1. Material Identification

Product Name: Sodium fluorideCatalog Number: io-3002CAS Number: 7681-49-4Identified uses: Laboratory chemicals, manufacture of chemical compoundsCompany: lonz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2) Acute toxicity, oral (Category 3) Acute toxicity, dermal (Category 3) Acute toxicity, inhalation (Category 3) Specific target organ toxicity, single exposure (Category 1)

Pictogram(s)



GHS Hazard Statements

>> H301 (98.9%): Toxic if swallowed [Danger Acute toxicity, oral]

- >> H315 (99.7%): Causes skin irritation [Warning Skin corrosion/irritation]
- >> H319 (99.7%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

Precautionary Statement Codes

>> P264, P264+P265, P270, P280, P301+P316, P302+P352, P305+P351+P338, P321, P330, P332+P317, P337+P317, P362+P364, P405, and P501

Health Hazards:

>> Ingestion may cause vomiting, abdominal pain, diarrhea, convulsions, collapse, thirst, disturbed color vision, acute toxic nephritis. (USCG, 1999)

ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> TOXIC and/or CORROSIVE; inhalation, ingestion or skin contact with material may cause severe injury or death.
- >> Contact with molten substance may cause severe burns to skin and eyes.
- >> Avoid any skin contact.
- >> Fire may produce irritating, corrosive and/or toxic gases.
- >> Runoff from fire control or dilution water may be corrosive and/or toxic and cause environmental contamination.
- >> Excerpt from ERG Guide 154 [Substances Toxic and/or Corrosive (Non-Combustible)]:
- >> Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.). Corrosives in contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. For electric vehicles or equipment,

ERG Guide 147 (lithium ion or sodium ion batteries) or ERG Guide 138 (sodium batteries) should also be consulted. (ERG, 2024)

ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

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- >> Corrosives in contact with metals may evolve flammable hydrogen gas.
- >> Containers may explode when heated.
- >> For electric vehicles or equipment, GUIDE 147 (lithium ion or sodium ion batteries) or GUIDE 138 (sodium batteries) should also be consulted.
- >> Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.

3. Composition/Information On Ingredients

Chemical name: Sodium fluorideCAS Number: 7681-49-4Molecular Formula: FNaMolecular Weight: 41.9882 g/mol

4. First Aid Measures

First Aid:

- >> EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.
- >> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.
- >> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.
- >> INGESTION: DO NOT INDUCE VOMITING. Corrosive chemicals will destroy the membranes of the mouth, throat, and esophagus and, in addition, have a high risk of being aspirated into the victim's lungs during vomiting which increases the medical problems. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. IMMEDIATELY transport the victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. Transport the victim IMMEDIATELY to a hospital. (NTP, 1992)

ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> General First Aid:
- >> Call 911 or emergency medical service.
- >> Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and avoid contamination.
- >> Move victim to fresh air if it can be done safely.
- >> Administer oxygen if breathing is difficult.
- >> If victim is not breathing:
- >> DO NOT perform mouth-to-mouth resuscitation; the victim may have ingestedor inhaled the substance.

- >> If equipped and pulse detected, wash face and mouth, then give artificial respiration using a proper respiratory medical device (bag-valve mask, pocket mask equipped with a one-way valve or other device).
- >> If no pulse detected or no respiratory medical device available, provide continuouscompressions. Conduct a pulse check every two minutes or monitor for any signs of spontaneous respirations.
- >> Remove and isolate contaminated clothing and shoes.
- >> For minor skin contact, avoid spreading material on unaffected skin.
- >> In case of contact with substance, remove immediately by flushing skin or eyes with running water for at least 20 minutes.
- >> For severe burns, immediate medical attention is required.
- >> Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.
- >> Keep victim calm and warm.
- >> Keep victim under observation.
- >> For further assistance, contact your local Poison Control Center.
- >> Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.
- >> Specific First Aid:
- >> For corrosives, in case of contact, immediately flush skin or eyes with running water for at least 30 minutes. Additional flushing may be required.
- >> In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Half-upright position. Refer for medical attention.

Skin First Aid

>> Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

Eye First Aid

>> First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Ingestion First Aid

>> Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Give one or two glasses of water to drink. Refer for medical attention .

5. Fire Fighting Measures

- >> Excerpt from ERG Guide 154 [Substances Toxic and/or Corrosive (Non-Combustible)]:
- >> SMALL FIRE: Dry chemical, CO2 or water spray.
- >> LARGE FIRE: Dry chemical, CO2, alcohol-resistant foam or water spray. If it can be done safely, move undamaged containers away from the area around the fire. Dike runoff from fire control for later disposal.
- >> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks in direct contact with flames. (ERG, 2024)
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>> In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

- >> Excerpt from ERG Guide 154 [Substances Toxic and/or Corrosive (Non-Combustible)]:
- >> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- >> SPILL: Increase the immediate precautionary measure distance, in the downwind direction, as necessary.
- >> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Evacuation: ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> Immediate precautionary measure
- >> Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- >> Spill
- >> For non-highlighted materials: increase the immediate precautionary measure distance, in the downwind direction, as necessary.
- >> Fire
- >> If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered containers. Carefully collect remainder. Then store and dispose of according to local regulations.

Accidental Release Measures

Public Safety: ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> CALL 911. Then call emergency response telephone number on shipping paper. If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- >> Keep unauthorized personnel away.
- >> Stay upwind, uphill and/or upstream.

>> Ventilate closed spaces before entering, but only if properly trained and equipped.

Spill or Leak: ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- >> Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- >> Stop leak if you can do it without risk.
- >> Prevent entry into waterways, sewers, basements or confined areas.
- >> Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- >> DO NOT GET WATER INSIDE CONTAINERS.

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- >> DO NOT GET WATER INSIDE CONTAINERS.

7. Handling And Storage

Safe Storage:

>> Separated from acids and food and feedstuffs.

Storage Conditions:

>> Aqueous solutions of sodium fluoride slowly decompose and become alkaline when stored in glass. Therefore, sodium fluoride solutions should be stored in tight, plastic containers, especially if the pH of the solution is less than 7.5. Sodium fluoride solutions and tablets should be stored at a temperature less than 40 °C, preferably between 15–30 °C; freezing of the solutions should be avoided. Sodium fluoride is incompatible with calcium and magnesium salts.

8. Exposure Control/ Personal Protection

>> TWA 2.5 mg/m3 [*Note: The REL also applies to other inorganic, solid fluorides (as F).]

- >> 2.5 [mg/m3], as F
- >> 2.5 [mg/m3], as F
- >> (as F): 2.5 mg/m

EU-OEL

>> (as F): 2.5 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> (inhalable fraction, as F): 1 mg/m

Emergency Response: ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> Small Fire
- >> Dry chemical, CO2 or water spray.
- >> Large Fire
- >> Dry chemical, CO2, alcohol-resistant foam or water spray.
- >> If it can be done safely, move undamaged containers away from the area around the fire.
- >> Dike runoff from fire control for later disposal.
- >> Fire Involving Tanks, Rail Tank Cars or Highway Tanks
- >> Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.
- >> Do not get water inside containers.
- >> Cool containers with flooding quantities of water until well after fire is out.
- >> Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- >> ALWAYS stay away from tanks in direct contact with flames.

Inhalation Risk:

>> Evaporation at 20 °C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying or when dispersed, especially if powdered.

Effects of Short Term Exposure:

>> The substance is irritating to the eyes, skin and respiratory tract. Ingestion could cause hypocalcaemia and hypokalaemia. This may result in central nervous system disorders and cardiac disorders.

Effects of Long Term Exposure:

>> The substance may have effects on the bones and teeth. This may result in fluorosis.

Fire Prevention

>> NO open flames. NO contact with hot surfaces.

Inhalation Prevention

>> Use ventilation (not if powder), local exhaust or breathing protection.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear face shield or eye protection in combination with breathing protection if powder.

Ingestion Prevention

>> Do not eat, drink, or smoke during work. Wash hands before eating.

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

- >> Wear positive pressure self-contained breathing apparatus (SCBA).
- >> Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE.
- >> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

Protective Clothing: ERG 2024, Guide 154 (Sodium fluoride, solid; Sodium fluoride, solution)

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Exposure Summary

>> Biological Exposure Indices (BEI) [ACGIH] - Fluorides in urine = 2 mg/L prior to shift or 3 mg/L at end of shift; (Repeated measurements recommended.)

Maximum Allowable Concentration (MAK)

>> 1.0 [mg/m3], as F, inhalable fraction[German Research Foundation (DFG)]

9. Physical And Chemical Properties

Molecular Weight:

>> 41.9881724

Exact Mass:

>> 41.98817244

Physical Description:

>> Sodium fluoride is a colorless crystalline solid or white powder, or the solid dissolved in a liquid. It is soluble in water. It is noncombustible. It is corrosive to aluminum. It is used as an insecticide. It is also used to fluorinate water supplies, as a wood preservative, in cleaning compounds, manufacture of glass, and for many other uses.

>> WHITE CRYSTALS OR POWDER.

Color/Form:

>> Colorless, cubic or tetragonal crystals

Odor:

>> Odorless

Taste:

The sensation of flavor perceived in the mouth and throat on contact with a substance.

>> SALTY

Boiling Point:

>> 3083 °F at 760 mmHg (NTP, 1992)

>> 1700 °C

Melting Point:

>> 1819 °F (NTP, 1992)

>> 993 °C

Solubility:

>> 10 to 50 mg/mL at 73 °F (NTP, 1992)

>> Solubility in water, g/100ml at 20 °C: 4.0

Density:

>> 2.79 at 68 °F (USCG, 1999) - Denser than water; will sink

>> 2.8 g/cm³

Vapor Pressure:

>> 1 mmHg at 1971 °F ; 5 mmHg at 2167 °F (NTP, 1992)

Autoignition Temperature:

>> Not flammable (USCG, 1999)

Decomposition:

>> When heated to decomposition it emits toxic fumes of /hydrogen fluoride and disodium oxide/.

pH:

pH is an expression of hydrogen ion concentration in water. Specifically, pH is the negative logarithm of hydrogen ion (H+) concentration (mol/L) in an aqueous solution. The term is used to indicate basicity or acidity of a solution on a scale of 0 to 14, with pH 7 being neutral.

>> 7.4 (Freshly prepared saturated soln)

Refractive Index:

>> INDEX OF REFRACTION: 1.336

Dissociation Constants:

рКа

>> 3.17

10. Stability And Reactivity

>> It is soluble in water.

11. Toxicological Information

Evidence for Carcinogenicity:

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> The IARC Working Group concluded that sodium fluoride (Group 3) are not classifiable as to their carcinogenicity to humans. /Sodium fluoride was reviewed by the IARC Working Group. Data for it are published in the IARC Monograph on sodium fluoride. No evaluation of the carcinogenicity for sodium fluoride is given; Fluorides (inorganic, used in drinking-water/

Exposure Routes:

- >> The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.
- >> inhalation, ingestion, skin and/or eye contact

Inhalation Exposure

>> Cough. Sore throat.

Skin Exposure

>> Redness.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

- >> Abdominal pain. Burning sensation. Convulsions. Drowsiness. Cough. Diarrhoea. Sore throat. Vomiting. Unconsciousness.
- >> irritation eyes, respiratory system; nausea, abdominal pain, diarrhea; salivation, thirst, sweating; stiff spine; dermatitis; calcification of ligaments of ribs, pelvis

Target Organs:

Organs that are affected by exposure to this chemical. Information in this section reflects human data unless otherwise noted.

>> Eyes, skin, respiratory system, central nervous system, skeleton, kidneys

Adverse Effects:

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Occupational hepatotoxin - Secondary hepatotoxins: the potential for toxic effect in the occupational setting is based on cases of poisoning by human ingestion or animal experimentation.

Interactions:

>> ... To examine the efficacy and safety of administration of calcium and magnesium orally and intraperitoneally to treat severe sodium fluoride intoxication ... mice were initially gavaged a lethal dose of sodium fluoride (NaF) or water. Then, mice were treated with water or varying concentrations of calcium chloride (CaCl2) or magnesium sulfate (MgSO4) via intraperitoneal (IP) route or via oral route. Mice were monitored for 24 h, and the time of death was recorded. ... Intraperitoneal injections of large amounts of CaCl2 or MgSO4 were dangerous. All mice gavaged with water and then treated with oral CaCl2 or MgSO4 survived and displayed normal activity during the experiment. The survival rate of mice gavaged with a lethal dose of NaF and then treated with a high dose of oral CaCl2 or MgSO4 was significantly higher than those of using low dose. /The authors concluded that/ oral administration of a high dose of CaCl2 or MgSO4 is a simple, safe, and effective adjunctive method for treating severe oral fluoride poisoning.

Antidote and Emergency Treatment:

>> ... Milk of magnesia is best because it precipitates fluoride as well as clearing the intestine. Vomitus and excreta should be washed away quickly to prevent burns. Calcium gluconate (20 mL of a 10 or 20 % soln) should be given iv at once. It should be repeated as required by the blood calcium level. It not only may alleviate carpopedal spasm but may raise the blood pressure to normal from a shock level. Additional treatment should be symptomatic depending on the progress of the case but should emphasize restoration of fluid balance. In one very severe case, an iv atrial pacemaker was necessary to control ventricular fibrillation; feeding through a gastrostomy was necessary for 30 days.

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ Two adults were able to withstand a dose of 250 mg with minimal illness. One volunteer experienced slight nausea and epigastric distress lasting about 5 hr and salivation, which was intense for 15 to 30 min and stopped in half an hour; an itching sensation on his hands and feet lasted for about a week. Another volunteer, who took 250 mg of sodium fluoride on an empty stomach, experienced nausea, which appeared in 2 min and in 20 min incr to a max accompanied by greatly incr salivation and some retching but no vomiting. Two hr after the dose, lunch was eaten but was immediately vomited. Slight nausea continued throughout the following day but disappeared on the second day.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Experimentally, sodium fluoride has been tested on rabbit eyes in several different ways. Application of a 2% aqueous solution to the eye caused corneal epithelial defects and necrotic areas in the conjunctiva. Injection subconjunctivally or into the anterior chamber caused corneal edema and a severe

inflammatory reaction in the eye with hemorrhages in the iris.[Grant, W.M. Toxicology of the Eye. 3rd ed. Springfield, IL: Charles C. Thomas Publisher, 1986., p. 435]

Human Toxicity Values:

Quantitative human toxicity values (e.g., lethal dose) for this compound.

>> The oral dose of sodium fluoride that may be fatal is not known but is estimated to be about 5–10 g (70–140 mg/kg) in untreated adults and 500 mg in children.

Non-Human Toxicity Values:

>> LD50 Mice oral 44.3 mg/kg (Admin via stomach tube, under light ether anaesthesia)

National Toxicology Program Studies:

Reports from the National Toxicology Program, an interagency program supported by three government agencies (NIH, FDA, and CDC) within the Department of Health and Human Services. This program plays a critical role in generating, interpreting, and sharing toxicological information about chemicals of public health concerns.

>> 14-Day Studies: Rats and mice received sodium fluoride in drinking water at concentrations as high as 800 ppm. (Concentrations are expressed as sodium fluoride; fluoride ion is 45% of the sodium salt by weight.) In the high-dose groups, 5/5 male and 5/5 female rats and 2/5 male mice died; one female rat was given 400 ppm in the drinking water also died before the end of the studies.No gross lesions were attributed to sodium fluoride administration. 6-Month Studies: Rats received concentrations of sodium fluoride in drinking water as high as 300 ppm, and mice as high as 600 ppm. No rats died during the studies; however, among the mice, 4/9 high-dose males, 9/11 high-dose females, and 1/8 males in the 300 ppm group died before the end of the studies. Weight gains were less than those of controls for rats receiving 300 ppm and mice receiving 200 to 600 ppm. The teeth of rats and mice receiving the higher doses of sodium fluoride were chalky white and chipped or showed unusual wear patterns. Mice and male rats given the higher concentrations had microscopic focal degeneration of the enamel organ. Rats receiving 100 or 300 ppm sodium fluoride had minimal hyperplasia of the gastric mucosa of the stomach, and one high-dose rat of each sex had an ulcer. Acute nephrosis and/or lesions in the liver and myocardium were observed in mice that died early, and minimal alterations in bone growth/remodeling were observed in the long bones of mice receiving sodium fluoride at concentrations of 50 to 600 ppm. /Two-Year Studies;/ The sodium fluoride concentrations selected for the 2-year studies in both rats and mice were 0, 25, 100, and 175 ppm in the drinking water. ... The teeth of rats and mice has a dose-dependent whitish discoloration, and male rats had an increased incidence of tooth deformities and attrition leading on occasion to malocclusion. The teeth of male and, to a lesser degree, female rats had areas of microscopic dentine dysplasia and degeneration of ameloblasts. Dentine dysplasia occurred in both dosed and control groups of male and female mice; the incidence of this lesion was significantly greater in high-dose than in control male mice. Osteosclerosis of long bones was increased in female rats given drinking water containing 175 ppm sodium fluoride. No other significant nonneoplastic lesions in rats or mice appeared related to sodium fluoride administration. Osteosarcomas of bone were observed in 1/50 male rats in the 100 ppm group and in 3/80 male rats in the 175 ppm group. None were seen in the control or 25 ppm dose groups. One other 175 ppm male rat had an extra skeletal osteosarcoma arising in the subcutaneous tissue. Osteosarcomas occur in historical control male rats at an incidence of 0.5% (range 0-6%). The historical incidence is not directly comparable with the incidences observed in this study because examination of bone was more comprehensive in the sodium fluoride studies than in previous NTP studies of other chemicals, and the diet used in previous studies was not controlled for fluoride content. In the current study, although the pairwise comparison of the incidence in the 175 ppm group versus that in the controls was not statistically significant, osteosarcomas occurred with a statistically significant dose-response trend, leading to the conclusion that a weak association may exist between the occurrence of these neoplasms and the administration of sodium fluoride. No other neoplastic lesions in rats or mice were considered possibly related to chemical administration. Conclusions: Under the conditions of these 2-year dosed water studies, there was equivocal evidence of carcinogenic activity of sodium fluoride in male F344/N rats, based on the occurrence of a small number of osteosarcomas in dosed animals. "Equivocal evidence" is a category for uncertain findings defined as studies that are interpreted as showing a marginal increase of neoplasms that may be related to chemical administration. There was no evidence of carcinogenic activity in female F344/N rats receiving sodium fluoride at concentrations of 25, 100, or 175 ppm (11, 45, or 79 ppm fluoride) in drinking water for 2 years. There was no evidence of carcinogenic activity of sodium fluoride in male or female mice receiving sodium fluoride at concentrations of 25, 100, or 175 ppm in drinking water for 2 years. Dosed rats had lesions typical of fluorosis of the teeth and female rats receiving drinking water containing 175 ppm sodium fluoride had increased osteosclerosis of long bones.

Populations at Special Risk:

>> Populations that appear to be at increased risk from the effects of fluoride are individuals that suffer from diabetes insipidus or some forms of renal impairment. These high risk populations represent a relatively small segment of the general populations. /Fluoride/

Protein Binding:

In this section, "protein binding" refers to the degree to which medications attach to plasma proteins (i.e., proteins within the blood, such as human serum albumin, lipoprotein, glycoprotein and globulins). A drug's efficiency may be affected by the degree to which it binds to plasma proteins. The less bound a drug is, the more efficiently it can traverse cell membranes or diffuse.

>> Fluoride ions are bound to plasma proteins. The percentage of protein binding is not readily available in the evaluated literature.

12. Ecological Information

<pre>>> 3.90e+03 Industrial Soil (mg/kg) >> 5.80e+04 Resident Air (ug/m3) >> 1.50e+01 Industrial Air (ug/m3) >> 6.10e+01 Tapwater (ug/L) >> 1.00e+03 MCL (ug/L) >> 1.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile</pre>	esident Soil (mg/kg)
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<pre>>> 1.50e+01 Industrial Air (ug/m3) >> 6.10e+01 Tapwater (ug/L) >>> 1.00e+03 MCL (ug/L) >>> 4.00e+03 Risk-based SSL (mg/kg) >>> 1.50e+02 MCL-based SSL (mg/kg) >>> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >>> Volatile</pre>	esident Air (ug/m3)
Industrial Air (ug/m3) >> 6.10e+01 Tapwater (ug/L) >> 1.00e+03 MCL (ug/L) >> 4.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 1.50e+01
>> 610e+01 Tapwater (ug/L) >> 100e+03 MCL (ug/L) >> 4.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	idustrial Air (ug/m3)
Tapwater (ug/L) >> 1.00e+03 MCL (ug/L) >> 4.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 6.10e+01
>> 1.00e+03 MCL (ug/L) >> 4.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	apwater (ug/L)
MCL (ug/L) >> 4.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 1.00e+03
<pre>>> 4.00e+03 Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile</pre>	ICL (ug/L)
Risk-based SSL (mg/kg) >> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 4.00e+03
<pre>>> 1.50e+02 MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile</pre>	isk-based SSL (mg/kg)
MCL-based SSL (mg/kg) >> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 1.50e+02
>> 6.00e+02 Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	CL-based SSL (mg/kg)
Chronic Oral Reference Dose (mg/kg-day) >> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 6.00e+02
>> 5.00e-02 Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	hronic Oral Reference Dose (mg/kg-day)
Chronic Inhalation Reference Concentration (mg/m3) >> 1.40e-02 Volatile >> Volatile	>> 5.00e-02
>> 1.40e-02 Volatile >> Volatile	hronic Inhalation Reference Concentration (mg/m3)
Volatile >> Volatile	>> 1.40e-02
>> Volatile	olatile
	>> Volatile
Mutagen	utagen
>> Mutagen	>> Mutagen
Fraction of Contaminant Absorbed in Gastrointestinal Tract	raction of Contaminant Absorbed in Gastrointestinal Tract
>>1	>>1

13. Disposal Considerations

Spillage Disposal

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered containers. Carefully collect remainder. Then store and dispose of according to local regulations.

Disposal Methods

>> SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational exposure or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or water; effects on animal, aquatic, and plant life; and conformance with environmental and public health regulations.

- >> Group III Containers (both combustible and non-combustible) that previously held organic mercury, lead, cadmium, arsenic, or inorganic pesticides should be triple rinsed, punctured and disposed of in a sanitary landfill. Non-rinsed containers should be encapsulated and buried at a specially designated landfill site. /Organic mercury, lead, cadmium, arsenic, or inorganic pesticides/
- >> A suggested disposal method converts the soluble fluoride ions to insoluble calcium fluoride ... a naturally occurring mineral (fluorspar) which can safely be added to a landfill. The method is as follows: add slowly to a large container of water. Stir in slight excess of Na2CO3 /sodium carbonate/. If fluoride is present add Ca(OH)2 /calcium hydroxide/ also. Let stand 24 hr. Decant or siphon into another container and neutralize with 6 m HCl /hydrochloric acid/ before washing down with large excess of water. The sludge may be added to landfill. Recommendable methods: Precipitation & landfill.
- >> Precipitation & landfill: Industry wastes with a high fluoride concn are treated in two phases. By adding CaO /calcium oxide/, the soluble fluorides are precipitated as CaF2 /calcium fluoride/ until the concn has been reduced to 10 mg/l. The compact sludge is disposed of on special waste dumps.

14. Transport Information

DOT

Sodium fluoride 6.1 UN Pack Group: III Reportable Quantity of 1000 lb or 454 kg

IATA

Sodium fluoride 6.1, UN Pack Group: III

15. Regulatory Information

Federal Drinking Water Standards:

Federal drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> EPA 4,000 ug/L /Fluoride ion/

Federal Drinking Water Guidelines:

Federal drinking water guidelines (e.g. maximum containment level (MCL)) for this chemical. In general, these guidelines are recommendations and not legally enforceable.

>> EPA 2,000 ug/L /Fluoride ion/

State Drinking Water Standards:

State drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> (CA) CALIFORNIA 2,000 ug/L /Fluoride/

Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> Sodium fluoride is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Sodium fluoride (NaF)

REACH Registered Substance

>> Status: Active Update: 26-10-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/14274

>> Status: Cease Manufacture Update: 28-03-2018 https://echa.europa.eu/registration-dossier/-/registered-dossier/23341

New Zealand EPA Inventory of Chemical Status

>> Sodium fluoride: Does not have an individual approval but may be used under an appropriate group standard

16. Other Information

Other Safety Information

Chemical Assessment

- >> IMAP assessments Sodium fluoride (NaF): Human health tier I assessment
- >> IMAP assessments Sodium fluoride (NaF): Environment tier I assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."