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## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** 20% Fluorine in nitrogen mixture      **CHEMICAL FORMULA:** 20 Molar % F2 in N2      **PRODUCT CODE:**

**COMPANY NAME:**

**PELICHEM:** The Chemical Division of NECSA

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## 2. COMPOSITION/INFORMATION ON INGREDIENTS

**CHEMICAL NAME OF SUBSTANCE:** 20% Fluorine in nitrogen mixture      **CONCENTRATION:** 20% F2 in N2

**SYNONYMS:**

**UN No:**  
3303

**CAS-No: F2**  
007782-41-4

**CAS-No: N2**  
7727-37-9

## 3. HAZARDS IDENTIFICATIONS

### EMERGENCY OVERVIEW

Pale yellow gas with pungent odor. Potentially fatal if inhaled, respiratory tract burns, skin burns, and eye burns. May explode on contact with water. Strong oxidizer. May ignite or explode on contact with combustible materials. Containers may rupture or explode if exposed to heat. May react on contact with water. Releases toxic, corrosive, flammable or explosive gases

## 4. FIRST AID MEASURES

Prompt medical attention is required in all cases of over exposure to fluorine, rescue personnel should be equipped with appropriate protective equipment (self-contained breathing apparatus, etc. To prevent unnecessary exposure

**Inhalation:** Move exposed personnel to an uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Keep victim warm and quiet. Assure the mucus or vomited material does not obstruct the airway by use of positional drainage. Delayed pulmonary oedema may occur. Keep patient under medical observation for at least 24 hours.

**Eye contact:** PERSONS WITH POTENTIAL EXPOSURE TO THIS MIXTURE SHOULD NOT WEAR CONTACT LENSES. Flush contaminated eye(s) with large quantities of water. Hold eyelids open with fingers to assure complete flushing. Continue for minimum of 30 minutes. Skin contact: Flush affected area with large quantities of water. Remove affected clothing as rapidly as possible. Skin burns may be treated with a calcium gluconate gel or slurry in water or glycerine. This compound binds the active fluorides in

an insoluble form and limits burn extension and relieves pain.

**Special protection information:**

Respiratory protection. Positive pressure airline with mask or self-contained breathing apparatus should be available for emergency use.

**5. FIRE-FIGHTING MEASURES**

**Special fire fighting procedures:**

Fires with this mixture as the oxidizer can only be extinguished by shutting off the source of this mix. Do not use water, chemicals, carbon dioxide or other extinguishing media; these will only add more fuel to the fire.

**Unusual fire and explosion hazards**

Combustion products from a fire with fluorine as an oxidizer are generally toxic and reactive. These products usually include hydrogen fluoride and oxygen difluoride. Cylinders exposed to heat or fire may vent rapidly or explode.

**6. ACCIDENTAL RELEASE MEASURES  
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED**

Evacuate all personnel from effected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container, or container valve, call the emergency phone number on the first page of this MSDS.

**7. HANDLING AND STORAGE**

Use only in well ventilated areas. Valve protection cape must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure piping or systems. Use a check valve or trap in the discharge line to prevent hazardous backflow into the cylinder.

20% fluorine/nitrogen mixture is handled at considerably higher pressure than pure fluorine. Assure that equipment is rated for pressure involved.

**Special storage recommendations:**

Protect cylinders from physical damage. Store in a cool, dry, well-ventilated area away from heavily travelled areas and emergency exits. Do not allow temperature where cylinders are stored to exceed 51.7°C. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in – first out" inventory system to prevent full cylinders being stored for excessive periods of time. Isolate this mixture from flammable materials.

**Special packaging recommendations:**

Most metals form a passive fluoride film that protects the metal from further corrosion. MONEL and nickel are preferred for higher temperature applications. TEFLON and ANNEALED COPPER are the preferred gasket materials.

Double valving should be employed near the source of 20% fluorine mixture. Any equipment used for 20% fluorine nitrogen mixture service should first be thoroughly cleaned, degreased and dried, then treated with increasing concentrations of fluorine gas mixture so any impurities may be burned out without the simultaneous ignition of

equipment. Avoid repeated bending or vibrating of piping or equipment, which results in a flaking of the protective fluoride film.

**Other recommendations or precautions**

Keep equipment scrupulously dry. Many of the metal fluorides are water soluble so that the passive film corrosion protection may be destroyed if wetted with water. Compressed gas cylinders should not be refilled except by qualified producers of compressed gas. Shipment of a compressed gas cylinder, which has not been filled by the owner or with his (written) consent is a violation of various country and state laws and may lead to prosecution.

**8. EXPOSURE CONTROLS AND PERSONAL PROTECTION**

**Time weighted average exposure limit:**

For fluorine: OSHA: PEL = 0.1ppm, ACGIH; TWA=1ppm, STEL = 2ppm  
 For nitrogen: OSHA none established, ACGIH, and simple asphyxiant

**Ventilation:**

Minimum of ten (10) air changes per hour for enclosed areas or hoods.

**Protective gloves:**

Chrome leather

**Eye protection:**

Safety goggles or glasses, face shield

**Other protective equipment:**

Safety shoes, safety shower, eyewash fountain, chrome leather welders jacket.

**Local exhaust**

To prevent accumulation above the TWA for F2.

**Symptoms of exposure**

The toxic component of the mix is fluorine. Fluorine is corrosive and irritating to the upper and lowers respiratory tracts, skin and eyes. Fluorine hydrolysis to form hydrofluoric acid, therefore skin burns and mucous membrane irritation are similar to those caused by that acid. Symptoms include tearing of the eyes, cough, difficult breathing and abnormal fluids formation in the nose, mouth and throat. Inhalation of fluorine may cause pneumonitis (deep lung inflammation) and pulmonary oedema (abnormal fluids build-up in the lungs), which could be fatal. Symptoms of hydrofluoric acid burns are severe pains, redness, and possible swelling and tissue destruction.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Boiling point:**

N2 = -195.83°C  
 P2 = 188.22°C

**Liquid density at boiling point:**

N2 = 805,71kg/m3  
 F2 = 1508,90kg/m3

**Vapour pressure:**

Gas

**Gas density at 21,1°C, 101,3kPa**

**Solubility in water**  
 F2 reacts violently

**Appearance and odour:**

Pale yellow gas, choking ozone like

Mix 1,217 kg/m<sup>3</sup>

odour.

Specific gravity @ 21,1°C = 1,0 (air = 1)

**Flash point:**

Method used N/A

**Auto ignition temp**

Non-flammable

**Flammable limits % by volume**

Non-flammable

**Extinguishing media**

Non-flammable

## 10. STABILITY AND REACTIVITY

**INCOMPATIBILITY (Materials to avoid)**

Incompatible with all materials except certain perfluorinated hydrocarbons and some metals, which have been passivated.

**HAZARDOUS DECOMPOSITION PRODUCTS**

None

**HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES**

This mixture is less reactive than pure fluorine, however it will act as an oxidizing agent and is capable of supporting and accelerating combustion.

## 11. TOXICOLOGICAL INFORMATION

The fluorine component in the mix provides a sharp, pungent odour, which is a useful warning of acutely toxic levels in the atmosphere.

It is irritating and corrosive to all living tissues. Toxic levels exposure to skin tissue causes hydrofluoric acid burns and skin lesions resulting in tissue destruction and eventual scarring. Burns are progressive while any residual active fluorides remain. Chemical pneumonitis pulmonary oedema results from exposure to the lower respiratory tract and deep lung. Residual pulmonary malfunction might occur. Burns of the eye result in lesions and possible loss of vision. Extended low-level systematic absorption of fluorine may cause fluorosis, an abnormal calcium accumulation in the bone structure.

This mixture is not listed in the IARC, NTP or OSHA Subpart Z as a carcinogen or a potential carcinogen.

## 12. ECOLOGICAL INFORMATION:

## 13. DISPOSAL CONSIDERATIONS

In case of material release all state and local regulations regarding health and pollution should be followed in waste disposal. Contact supplier for specific recommendations. Do not dispose of unused quantities of fluorine.

Return the properly labelled container to NECSA for disposal with valve(s) tightly closed, outlet seal(s) secured and valve protection cap in place. For emergency disposal assistance, call the emergency numbers listed herein.

## 14. TRANSPORT INFORMATION

<b>UN NO:</b> 3303 <b>ADR/RID:</b>	<b>HAZARD CLASS:</b> <b>Class:</b> 2.3; 5.1 <b>Labels:</b> Toxic gas <b>Subrisk:</b> Oxidizer	<b>LABELLING:</b> <b>CORRECT TECHNICAL NAME:</b> Compressed gas, Toxic, Oxidiser, N.O.S
<b>IMDG:</b>	<b>Class:</b> 2.3; 5.1 <b>Labels:</b> Toxic gas <b>Subrisk:</b> Oxidizer	<b>CORRECT TECHNICAL NAME:</b> Compressed gas, Toxic, Oxidiser, N.O.S
<b>IATA:</b>	<b>Class:</b> 2.3; 5.1 <b>Labels:</b> Toxic gas <b>Subrisk:</b> Oxidizer	<b>Passenger aircraft or railcar:</b> Forbidden <b>Cargo Aircraft only::</b> Forbidden

## 15. REGULATORY INFORMATION

### APPLICABLE REGULATIONS:

Refer to country of destination.

### SAFETY AND RISK PHRASES:

Refer to country of destination.

## 16. OTHER INFORMATION

No other information is currently available for this record

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