



Material Safety Data Sheet

1. Product and Company Identification

Product name : **Fluorine**

Chemical formula : F₂

Synonyms : Atomic Fluorine; Fluorine Atom; Fluorine-19; Diatomic; F₂; UN 1045

Company : Specialty Gases of America, Inc
6055 Brent Dr.
Toledo, OH 43611

Telephone : 419-729-7732

Emergency : 800-424-9300

2. Composition/Information on Ingredients

Components	CAS Number	% Volume
Fluorine	7782-41-4	100%

3. Hazards Identification

Emergency Overview

Potentially fatal if inhaled, respiratory tract burns, skin burns, eye burns.
May explode on contact with water. Containers may rupture or explode if exposed to heat. Strong oxidizer.
Contact with combustible material may cause fire.

Potential Health Effects

Inhalation : Irritation (possibly severe), chest pain, bluish skin color, lung congestion, kidney damage, liver damage, convulsions, death. May cause tooth discoloration in long term exposure.

Eye contact : Irritation (possibly severe), blindness.

Skin contact : Irritation (possibly severe), blurred vision.

Ingestion : No information is available.

Chronic Health Hazard : None.

4. First Aid Measures

General advice : None.

Eye contact : Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Skin contact : Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). For burns, cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention.

Ingestion : No information is available.

Inhalation : If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If not breathing, oxygen should be administered by

qualified personnel. Get immediate medical attention.
Note to physicians : For inhalation, consider oxygen.
For skin contact, consider magnesium oxide/water/glycerin paste, calcium gluconate gel.

5. Fire-Fighting Measures

Suitable extinguishing media : Water. Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents.
Specific hazards : Negligible fire hazard. Oxidizer. May ignite or explode on contact with combustible materials. Containers may rupture or explode if exposed to heat.
Fire fighting : Move container from fire area if it can be done without risk. Cool containers with water spray until well after fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. For small fires, contain and let burn.

6. Accidental Release Measures

Occupational spill/release : Stop leak if possible without personal risk. Avoid contact with combustible materials. Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).
Additional advice : None.

7. Handling and Storage

Handling

Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders.

Storage

Store in accordance with all current regulations and standards. Keep separated from incompatible substances. Protect from physical damage. Avoid heat, flames, sparks and other sources of ignition. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30 Part B).

8. Exposure Controls / Personal Protection

Exposure limits

ACGIH : 1 ppm TWA
2 ppm STEL
OSHA (final) : 0.1 ppm TWA; 0.2 mg/m³ TWA
OSHA (vacated) : 0.1 ppm TWA; 0.2 mg/m³ TWA
NIOSH : 0.1 ppm TWA; 0.2 mg/m³ TWA

IDLH

25 ppm

Engineering measures/Ventilation

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal protective equipment

- Respiratory protection : The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
1 ppm – Any supplied-air respirator.
2.5 ppm – Any supplied-air respirator operated in a continuous-flow mode.
5 ppm – Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
25 ppm – Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
Emergency or planned entry into unknown concentrations or IDLH conditions –
Any self-contained breathing apparatus that has a full facepiece and is operated in pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape – Any air-purifying respirator full facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against this substance. Only non-oxidizable sorbents are allowed (not charcoal).
Any appropriate escape-type, self-contained breathing apparatus.
- Hand protection : Wear appropriate chemical resistant gloves.
- Eye protection : Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
- Skin and body protection : Wear appropriate chemical resistant clothing.

9. Physical and Chemical Properties

- Form : Gas.
Color : Yellow.
Odor : Pungent odor.
Molecular weight : 38.0
Vapor pressure : 1219.89 mmHg @ -183.75°C
Vapor density : 1.7 (air = 1)
Specific gravity : 1.14 @ 200°C (water = 1)
Boiling point : -306°F (-188°C)
Melting point : -362°F (-219°C)
Water solubility : Reacts.
Evaporation rate : Not applicable.

10. Stability and Reactivity

- Stability : May react with evolution with heat on contact with water. Releases toxic, corrosive, flammable or explosive gases. May explode on contact with water.
- Conditions to avoid : Avoid contact with combustible materials. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.
- Materials to avoid : Combustible materials, metal oxides, bases, metal salts, peroxides, halogens, halo carbons, acids, metal carbide, metals, oxidizing materials, reducing agents.
- Hazardous decomposition products : Thermal decomposition products: miscellaneous decomposition products.

11. Toxicological Information

The components of this material have been reviewed in various sources and the following selected endpoints are published:

FLUORINE (7782-41-4) : Inhalation LC50 Rat: 185 ppm/1H

Acute Toxicity Level

FLUORINE (7782-41-4) : Highly toxic: inhalation

Component Carcinogenicity

ACGIH : A4 – Not Classifiable as a Human Carcinogen

Local Effects

FLUORINE (7782-41-4) : Corrosive: inhalation, skin, eye

Medical Conditions Aggravated by Exposure

Respiratory disorders

12. Ecological Information

No LOLI ecotoxicity data are available for this product's components.

13. Disposal Considerations

Waste from residues / unused products : Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): P056.
Contaminated packaging : Return cylinder to supplier.
Component Waste Numbers : RCRA: waste_number P056

14. Transport Information

DOT (US only)

Proper shipping name : Fluorine, compressed
Class : 2.3
UN/ID No. : UN1045
Labeling : Inhalation Hazard; Oxidizer; Corrosive.
Additional Info : Toxic-Inhalation Hazard Zone A

Further information

Cylinders should be transported in a secure upright position in a well ventilated truck.

15. Regulatory Information

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

FLUORINE (7782-41-4)
SARA 302 : 500 lb TPQ
10 lb final RQ; 4.54 kg final RQ

SARA 313 : 1.0% de minimis concentration
CERCLA : 10 lb final RQ; 4.54 kg final RQ
OSHA (safety) : 1000 lb TQ

SARA 311/312

Acute: Yes
Chronic: Yes
Fire: Yes
Reactive: Yes
Pressure: Yes

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
FLUORINE	7782-41-4	Yes	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

16. Other Information

Prepared by : Specialty Gases of America, Inc.

For additional information, please visit our website at www.americangasgroup.com.