



MATHESON

ask...The Gas Professionals™

Safety Data Sheet

Material Name 5% Fluorine in Argon

SDS ID: 00244510

Section 1 - IDENTIFICATION

Product Identifier: 5% Fluorine in Argon

Recommended Use

Nanotechnology

Restrictions on Use

None known.

Manufacturer Information

MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with 29 CFR 1910.1200

- Oxidizing gas, Category 1
- Gas under pressure, Compressed gas
- Acute Toxicity (Inhalation), Category 1 (95% unknown)
- Skin Corrosion / Irritation, Category 1
- Serious Eye Damage/Eye Irritation, Category 1
- Toxic to reproduction, Category 2
- Specific Target Organ Toxicity - Single Exposure, Category 1 (kidneys, liver, and respiratory system)
- Specific Target Organ Toxicity - Repeated Exposure, Category 1 (respiratory system and testes)

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statement(s)

- May cause or intensify fire; oxidizer.
- Contains gas under pressure; may explode if heated
- Fatal if inhaled
- Causes severe skin burns and eye damage.
- Suspected of damaging fertility or the unborn child
- Causes damage to kidneys, liver, and respiratory system.
- Causes damage to respiratory system and testes through prolonged or repeated exposure.

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Precautionary Statement(s)

Prevention

Keep away from clothing and other combustible materials. Keep reduction valves free from grease and oil. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe gas. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Do not eat, drink or smoke when using this product. Wear protective gloves/clothing and eye/face protection. Use personal protective equipment as required. Wash thoroughly after handling.

Response

In case of fire, stop leak if safe to do so. IF exposed or concerned: Get medical advice/attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician. Specific treatment is urgent, see first aid section of Safety Data Sheet. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or doctor/physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician.

Storage

Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal

Dispose of in accordance with applicable regulations.

Hazard(s) Not Otherwise Classified

May cause asphyxia. May cause frostbite upon sudden release of compressed gas.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component	Percent
7440-37-1	Argon	95
7782-41-4	Fluorine	5

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Fluorides.

Section 4 - FIRST AID MEASURES

Description of Necessary Measures

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention. Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.

Eyes

Immediately flush eyes with plenty of water for at least 60 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion

If swallowed, do not induce vomiting. Rinse mouth. Get immediate medical attention.

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Most Important Symptoms/Effects

Acute

frostbite, suffocation, respiratory tract burns, skin burns, eye burns, mucous membrane burns, kidney damage, liver damage, respiratory system damage

Delayed

reproductive effects, respiratory system damage, effects on the testes

Indication of Immediate Medical Attention and Special Treatment

For inhalation, consider oxygen.

Avoid gastric lavage or emesis.

Section 5 - FIRE FIGHTING MEASURES

Suitable Extinguishing Media

water

Unsuitable Extinguishing Media

Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents.

Specific Hazards Arising from the Chemical

Negligible fire hazard. Oxidizer. May ignite or explode on contact with combustible materials. Containers may rupture or explode if exposed to heat.

Hazardous Combustion Products

Combustion: fluorinated compounds

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Do not get water inside container. Do not direct water at source of leak or safety devices; icing may occur. Avoid inhalation of material or combustion by-products. Stay away from the ends of tanks. For tank, rail car or tank truck: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.

Evacuation radius: 800 meters (1/2 mile).

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

Move containers away from spill to a safe area. Do not get water inside container. Do not touch or walk through spilled material. Avoid contact with combustible materials. Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Stay upwind and keep out of low areas. Stop leak if possible without personal risk. Damaged cylinders should be handled only by specialists.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe gas. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Do not eat, drink, or smoke when using this product. Wear protective gloves/clothing and eye/face protection. Use personal protective equipment as required. Wash thoroughly after handling.

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Conditions for Safe Storage, including any Incompatibilities

Store and handle in accordance with all current regulations and standards. Avoid direct sunlight. Store in a tightly closed container. Store in a well-ventilated place. Cylinders should be stored upright (with valve protection cap in place). Store in a cool, dry place. Store locked up. Keep separated from incompatible substances.

Incompatibilities combustible materials, metal oxides, bases, metal salts, peroxides, halogens, halocarbons, acids, metal carbide, metals, oxidizing materials, reducing agents

* * *Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Component Exposure Limits

Argon (7440-37-1)

ACGIH: Simple asphyxiant (See Appendix F: Minimal Oxygen Content)

Fluorine (7782-41-4)

ACGIH: 1 ppm TWA
2 ppm STEL

Europe: 1 ppm TWA; 1.58 mg/m³ TWA
2 ppm STEL; 3.16 mg/m³ 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

Component Biological Limit Values

Fluorine (7782-41-4)

ACGIH: 2 mg/L Medium: urine Time: prior to shift Parameter: Fluoride (background, nonspecific); 3 mg/L Medium: urine Time: end of shift Parameter: Fluoride (background, nonspecific, related to Fluorides)

Appropriate Engineering Controls

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

Individual Protection Measures, such as Personal Protective Equipment

Eyes/Face Protection

Wear splash resistant safety goggles with a faceshield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection

For the gas: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing.

Glove Recommendations

For the gas: Wear appropriate chemical resistant gloves. For the liquid: Wear insulated gloves.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
fluorine:

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

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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 a 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 full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.

Only non-oxidizable sorbents are allowed (not charcoal).

Any appropriate escape-type, self-contained breathing apparatus.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Gas	Appearance:	Colorless gas
Color:	colorless	Physical Form:	compressed gas
Odor:	Not available	Odor Threshold:	Not available
pH:	Not available	Melting/Freezing Point:	Not available
Boiling Point:	Not available	Flash Point:	Non-flammable
Decomposition:	Not available	Evaporation Rate:	Not available
LEL:	Not available	UEL:	Not available
Vapor Pressure:	Not available	Vapor Density (air = 1):	Not available
Specific Gravity (water=1):	Not available	Water Solubility:	reacts (fluorine)
Log KOW:	Not available	Auto Ignition:	Not available
Viscosity:	Not available		

Other Property Information

No additional information is available.

Section 10 - STABILITY AND REACTIVITY

Chemical Stability

May react with evolution of heat on contact with water. Releases toxic, corrosive, flammable or explosive gases.

May explode on contact with water.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Protect from physical damage. Containers may rupture or explode if exposed to heat.

Incompatible Materials

combustible materials, metal oxides, bases, metal salts, peroxides, halogens, halocarbons, acids, metal carbide, metals, oxidizing materials, reducing agents

Hazardous Decomposition

Combustion: fluorinated compounds

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Section 11 - TOXICOLOGICAL INFORMATION

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

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 1 h

RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

Fluorine (7782-41-4)

Inhalation: 1250 mg/m³/5 minute(s) Inhalation Guinea pig LC50; 170 ppm/1 hour Inhalation Guinea pig LC50; 250 mg/m³/60 minute(s) Inhalation Guinea pig LC50; 150 ppm/1 hour Inhalation Mouse LC50; 1250 mg/m³/5 minute(s) Inhalation Mouse LC50; 250 mg/m³/60 minute(s) Inhalation Mouse LC50; 150 ppm/60 minute(s) Inhalation Mouse LC50
1250 mg/m³/5 minute(s) Inhalation Rat LC50; 185 ppm/1 hour Inhalation Rat LC50; 250 mg/m³/60 minute(s) Inhalation Rat LC50

Acute Toxicity Level

Fluorine (7782-41-4)

Highly Toxic: inhalation

Information on Likely Routes of Exposure

Inhalation

burns, nausea, vomiting, difficulty breathing, irregular heartbeat, headache, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma

Ingestion

ingestion of a gas is unlikely

Skin Contact

burns, frostbite

Eye Contact

burns, frostbite

Immediate Effects

frostbite, suffocation, respiratory tract burns, skin burns, eye burns, mucous membrane burns, kidney damage, liver damage, respiratory system damage

Delayed Effects

reproductive effects, respiratory system damage, effects on the testes

Medical Conditions Aggravated by Exposure

respiratory disorders

Irritation/Corrosivity Data

respiratory tract burns, skin burns, eye burns, mucous membrane burns

RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

Fluorine (7782-41-4)

68 ppm/1 hour Eyes; 25 ppm/5 minute(s) Eyes Human mild; 467 ppm/5 minute(s) Eyes Mouse; 140 ppm/30 minute(s) Eyes Rat

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Local Effects

Fluorine (7782-41-4)

Corrosive: inhalation, skin, eye

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Carcinogenicity

Component Carcinogenicity

Fluorine (7782-41-4)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (related to Fluorides)

RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Reproductive Effects Data

Available data characterizes components of this product as reproductive hazards.

RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Specific Target Organ Toxicity - Single Exposure

kidneys, liver, respiratory system

Specific Target Organ Toxicity - Repeated Exposure

respiratory system, testes

Aspiration Hazard

Not applicable.

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity

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

Persistence and Degradability

fluorine is rapidly hydrolyzed to hydrogen fluoride.

Bioaccumulative Potential

No data available for the mixture.

Mobility

No data available for the mixture.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.

Hazardous Waste Number(s): D003.

Component Waste Numbers

Fluorine (7782-41-4)

RCRA: waste number P056

Section 14 - TRANSPORT INFORMATION

US DOT Information

Shipping Name: Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Contains: Argon, Fluorine)

UN/NA #: UN3306 **Hazard Class:** 2.3

Required Label(s): 2.3, 5.1, 8

Additional Info.: Inhalation Hazard Zone A

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IMDG Information

Shipping Name: Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Contains: Argon, Fluorine)

UN #: UN3306 **Hazard Class:** 2.3

Required Label(s): 2.3, 5.1, 8

* * *Section 15 - REGULATORY INFORMATION* * *

Component Analysis

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

SARA 304: 10 lb EPCRA 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 Hazardous Categories

Acute Health: Yes **Chronic Health:** Yes **Fire:** No **Pressure:** Yes **Reactive:** 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
Argon	7440-37-1	No	Yes	Yes	Yes	Yes
Fluorine	7782-41-4	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
Argon	7440-37-1	Yes	DSL	EIN	Yes	Yes	No	Yes	Yes	Yes
Fluorine	7782-41-4	Yes	DSL	EIN	Yes	Yes	No	Yes	Yes	Yes

* * *Section 16 - OTHER INFORMATION* * *

NFPA Ratings: Health: 4 Fire: 0 Reactivity: 4

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

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Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

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End of Sheet 00244510