ARKEMA

FORANE® 427A

SECTION 1. IDENTIFICATION

Product identifier

Product name : FORANE® 427A

Other means of identification

Product code : F0502

Synonyms : Forane (R) 427A, R427A

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Details of the supplier of the safety data sheet

Company name of supplier : Arkema Inc.

Address : 900 First Avenue
King of Prussia, PA 19406

Fluorochemicals
Telephone : (800) 331-7654
(Monday through Friday, 8:00 AM to 5:00 PM EST)

Emergency telephone number

Transportation : CHEMTREC:
(800) 424-9300
(24 hrs., 7 days a week)

Medical: : Rocky Mountain Poison Center: (866) 767-5089
(24 hrs., 7 days a week)

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Gases under pressure : Liquefied gas

Simple Asphyxiant

Other hazards

Liquid: Rapid evaporation of the liquid may cause frostbite. Vapor: Gas/vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. If inhaled: Central nervous system effects: headache, nausea, dizziness, drowsiness, loss of consciousness. Stress induced heart effects: Inhalation may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats and reduced heart function.

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : H280 Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Supplemental Hazard Statements : Overheating or overpressurizing may cause gas release or violent cylinder bursting.
May decompose on contact with flames or extremely hot metal surfaces to produce toxic and corrosive products.
May cause frostbite.
May cause headache, nausea, dizziness, drowsiness, loss of consciousness.
May cause cardiac sensitization/cardiac arrhythmia.

Precautionary statements :

Storage:

P410+P403 Protect from sunlight. Store in a well-ventilated place.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : Hydrofluorocarbon

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
Ethane, 1,1,1,2-tetrafluoro-	811-97-2*	50	-

Ethane, pentafluoro-	354-33-6*	25	-
Methane, difluoro-	75-10-5*	15	-
Ethane, 1,1,1-trifluoro-	420-46-2*	10	-

* Indicates that the identifier is a CAS No.

SECTION 4. FIRST AID MEASURES

If inhaled : If inhaled, remove victim to fresh air.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.
Get medical attention.

In case of skin contact : If on skin, flush exposed skin with lukewarm water (not hot), or use other means to warm skin slowly.
Get medical attention if frostbitten by liquid or if irritation occurs.
Remove contaminated clothing and shoes.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : Immediately flush eye(s) with plenty of water.

If swallowed : Ingestion is not applicable - product is a gas at ambient temperatures.

Most important symptoms and effects, both acute and delayed : May displace oxygen and cause rapid suffocation.

Indication of any immediate medical attention and special treatment needed

Notes to physician : Do not give drugs from adrenaline-ephedrine group.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Water spray
Carbon dioxide (CO2)
Dry powder
Foam

Specific hazards during firefighting	:	May decompose on contact with flames or extremely hot metal surfaces to produce toxic and corrosive products. Liquid and gas under pressure, overheating or overpressurizing may cause gas release and/or violent cylinder bursting. Container may explode if heated due to resulting pressure rise. Some mixtures of HCFCs and/or HFCs, and air or oxygen may be combustible if pressurized and exposed to extreme heat or flame. When burned, the following hazardous products of combustion can occur: hydrofluoric acid Carbon oxides Carbonyl halides
Further information	:	Fight fire with large amounts of water from a safe distance. Stop the flow of gas if possible. Water mist should be used to reduce vapor concentrations in air. Cool closed containers exposed to fire with water spray. Closed containers of this material may explode when subjected to heat from surrounding fire. After a fire, wait until the material has cooled to room temperature before initiating clean-up activities. Fire fighting equipment should be thoroughly decontaminated after use.
Special protective equipment for firefighters	:	Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel. Eliminate all ignition sources. Use Halogen leak detector or other suitable means to locate leaks or check atmosphere. Keep upwind. Evacuate enclosed spaces and disperse gas with floor-level

forced-air ventilation.
Avoid breathing leaked material.

Methods and materials for containment and cleaning up	:	Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Avoid breathing gas. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Keep container closed. Wear cold-insulating gloves/face shield/eye protection. Use only with adequate ventilation. Do not enter confined spaces unless adequately ventilated. Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty. Do not change or force fit connections. Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Conditions for safe storage	:	Keep away from direct sunlight. Keep cylinders restrained. Store in cool, dry, well ventilated area away from sources of ignition such as flame, sparks and static electricity.
Materials to avoid	:	Store separate from: Alkaline materials Alkaline earth metals Finely divided metals (aluminum, magnesium...) Strong bases Strong oxidizing agents
Further information on storage stability	:	Do not apply direct flame to cylinder. Do not store cylinder in direct sun or expose it to heat above 120 F (48.9 C.). Do not drop or refill this cylinder.

Packaging material	:	Suitable material: Ordinary steel Unsuitable material: Alloys containing more than 2% of magnesium, Plastic materials

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Ethane, 1,1,1,2-tetrafluoro-	811-97-2	TWA	1,000 ppm 4,240 mg/m3	WEEL
Ethane, pentafluoro-	354-33-6	TWA	1,000 ppm 4,900 mg/m3	WEEL
Methane, difluoro-	75-10-5	TWA	1,000 ppm 2,200 mg/m3	WEEL
Ethane, 1,1,1-trifluoro-	420-46-2	TWA	1,000 ppm 3,400 mg/m3	WEEL

Engineering measures : Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above).
If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.
Monitor carbon monoxide and oxygen levels in tanks and enclosed spaces.
Consult ACGIH ventilation manual, NFPA Standard 91 and NFPA Standard 654 for design of exhaust system and safe handling.

Personal protective equipment

Respiratory protection : Avoid breathing gas.
Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components (full facepiece recommended).
Consult respirator manufacturer to determine appropriate type equipment for a given application.
Observe respirator use limitations specified by NIOSH or the manufacturer.

For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Hand protection

Remarks	:	Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Rinse immediately if skin is contaminated. Wash contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.
Eye protection	:	Use good industrial practice to avoid eye contact. Where eye contact may be likely, wear chemical goggles and have eye flushing equipment available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquefied gas
Colour	:	Clear - colourless
Odour	:	Ether-like (slightly)
Odour Threshold	:	not determined
pH	:	Not applicable
Melting point/freezing point	:	No data available
Boiling point/boiling range	:	= -44.9 - -31.9 °F / -42.7 - -35.5 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not classified as a flammability hazard

Upper explosion limit / Upper flammability limit	:	None.
Lower explosion limit / Lower flammability limit	:	None.
Vapour pressure	:	10,735 hPa (68 °F / 20 °C) 2.08 MPa (122 °F / 50 °C)
Relative vapour density	:	3.21 (77 °F / 25 °C) (Air = 1.0)
Relative density	:	1.13 (77 °F / 25 °C) Reference substance: Water=1 (liquid) compressed liquefied gas
Density	:	1.17 g/cm3 (68 °F / 20 °C)
Solubility(ies)		
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	See section 12 for data
Auto-ignition temperature	:	1369 °F / 743 °C
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	Not applicable
Viscosity, kinematic	:	Not applicable
Particle characteristics		
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Possibility of hazardous reactions	:	None known.
Conditions to avoid	:	Keep away from heat and sources of ignition. Avoid contact with flames and red hot metallic surfaces Keep away from direct sunlight.
Incompatible materials	:	Alkaline earth metals Finely divided metals (aluminum, magnesium...) Alkali metals Strong bases Strong oxidizing agents
Hazardous decomposition products	:	Thermal decomposition giving toxic and corrosive products : Hydrogen fluoride Carbonyl halides Carbon oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Based on available data, the classification criteria are not met.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Acute inhalation toxicity	:	LC50 (Rat): 567000 ppm Exposure time: 4 h Test atmosphere: gas Assessment: Practically nontoxic. (mouse, dog, cat, monkey): Remarks: Signs/effects reported after acute exposure: anesthetic effects

Ethane, pentafluoro-:

Acute inhalation toxicity	:	LC0 (Rat): > 800000 ppm Exposure time: 4 h Test atmosphere: gas Assessment: Practically nontoxic.

Methane, difluoro-:

Acute inhalation toxicity	:	LC50 (Rat): > 520000 ppm Exposure time: 4 h Test atmosphere: gas

Assessment: Practically nontoxic.

Ethane, 1,1,1-trifluoro-:

Acute inhalation toxicity	:	LC0 (Rat): > 591000 ppm Exposure time: 4 h Test atmosphere: gas Assessment: No deaths occurred.

Skin corrosion/irritation

Not classified due to lack of data.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Species	:	Rabbit
Result	:	No skin irritation

Serious eye damage/eye irritation

Not classified due to lack of data.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Species	:	Rabbit
Result	:	No eye irritation

Respiratory or skin sensitisation

Skin sensitisation

Not classified due to lack of data.

Respiratory sensitisation

Not classified due to lack of data.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Test Type	:	Guinea pig maximization test
Result	:	Not a skin sensitizer.

Germ cell mutagenicity

Based on available data, the classification criteria are not met.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Genotoxicity in vitro	:	Remarks: No genetic changes were observed in laboratory tests using: bacteria, animal cells, human cells, yeast.
Genotoxicity in vivo	:	Remarks: No genetic changes were observed in laboratory tests using: mice, rats.
Germ cell mutagenicity - Assessment	:	Weight of evidence does not support classification as a germ cell mutagen.

Ethane, pentafluoro-:

Genotoxicity in vitro	:	Remarks: No genetic changes were observed in laboratory tests using: bacteria, animal cells, human cells.
Genotoxicity in vivo	:	Remarks: No genetic changes were observed in laboratory tests using: mice
Germ cell mutagenicity - Assessment	:	Weight of evidence does not support classification as a germ cell mutagen.

Methane, difluoro-:

Genotoxicity in vitro	:	Remarks: No genetic changes were observed in laboratory tests using: bacteria, animal cells, human cells.
Genotoxicity in vivo	:	Remarks: No genetic changes were observed in laboratory tests using: mice
Germ cell mutagenicity - Assessment	:	Weight of evidence does not support classification as a germ cell mutagen.

Ethane, 1,1,1-trifluoro-:

Genotoxicity in vitro	:	Remarks: No genetic changes were observed in a laboratory test using: bacteria, animal cells, human cells.
Genotoxicity in vivo	:	Remarks: No genetic changes were observed in a laboratory test using: mice

Germ cell mutagenicity - Assessment	:	Weight of evidence does not support classification as a germ cell mutagen.

Carcinogenicity

Not classified due to lack of data.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Species	:	Rat
Application Route	:	Inhalation
Result	:	Increase in tumor incidence was reported.
Target Organs	:	Testes
Remarks	:	males tumors were benign.
Species	:	Rat
Application Route	:	Inhalation
Result	:	No increase in tumor incidence was reported.
Remarks	:	females
Species	:	Mouse
Application Route	:	Inhalation
Result	:	No increase in tumor incidence was reported.
Species	:	Rat
Application Route	:	Oral
Result	:	No increase in tumor incidence was reported.
Carcinogenicity - Assessment	:	Weight of evidence does not support classification as a carcinogen

Ethane, 1,1,1-trifluoro-:

Species	:	Rat
Application Route	:	Oral
Result	:	No increase in tumor incidence was reported.
Carcinogenicity - Assessment	:	Weight of evidence does not support classification as a carcinogen

IARC No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Based on available data, the classification criteria are not met.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Effects on fertility	:	Test Type: Two-generation study Species: Rat Application Route: Inhalation Result: No toxicity to reproduction.
Effects on foetal development	:	Test Type: Exposure during pregnancy Species: Rat Application Route: Inhalation Result: No birth defects were observed. Remarks: delays in development at doses that produce effects in mothers Test Type: Exposure during pregnancy Species: Rabbit Application Route: Inhalation Result: No birth defects were observed. Remarks: delays in development at doses that produce effects in mothers
Reproductive toxicity - Assessment	:	Weight of evidence does not support classification for reproductive toxicity

Ethane, pentafluoro-:

Effects on foetal development	:	Test Type: Exposure during pregnancy Species: Rat Application Route: Inhalation Result: No birth defects were observed. Test Type: Exposure during pregnancy Species: Rabbit Application Route: Inhalation Result: No birth defects were observed.
Reproductive toxicity - Assessment	:	Weight of evidence does not support classification for reproductive toxicity

Methane, difluoro-:

Effects on foetal development	:	Test Type: Exposure during pregnancy Species: Rat Application Route: Inhalation Result: No birth defects were observed. Test Type: Exposure during pregnancy Species: Rabbit Application Route: Inhalation Result: No birth defects were observed.
Reproductive toxicity - Assessment	:	Weight of evidence does not support classification for reproductive toxicity

Ethane, 1,1,1-trifluoro-:

Effects on foetal development	:	Test Type: Exposure during pregnancy Species: Rat Application Route: Inhalation Result: No birth defects were observed. Test Type: Exposure during pregnancy Species: Rabbit Application Route: Inhalation Result: No birth defects were observed.
Reproductive toxicity - Assessment	:	Weight of evidence does not support classification for reproductive toxicity

STOT - single exposure

May displace oxygen and cause rapid suffocation.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

Ethane, pentafluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

Methane, difluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

Ethane, 1,1,1-trifluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

STOT - repeated exposure

Based on available data, the classification criteria are not met.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Ethane, pentafluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Methane, difluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Ethane, 1,1,1-trifluoro-:

Assessment	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Species	:	Rat
Application Route	:	Inhalation
Exposure time	:	Chronic
Symptoms	:	No adverse systemic effects reported.

Ethane, pentafluoro-:

Species	:	Rat
Application Route	:	Inhalation
Exposure time	:	Subchronic
Symptoms	:	No adverse systemic effects reported.

Methane, difluoro-:

Species	:	Rat
Application Route	:	Inhalation
Exposure time	:	Subchronic
Symptoms	:	No adverse systemic effects reported.

Ethane, 1,1,1-trifluoro-:

Species	:	Rat
Application Route	:	Inhalation
Exposure time	:	Subchronic
Symptoms	:	No adverse systemic effects reported.

Species	:	Rat
Application Route	:	Oral
Exposure time	:	Chronic
Symptoms	:	No adverse systemic effects reported.

Aspiration toxicity

Not classified due to lack of data.

Components:

Ethane, 1,1,1,2-tetrafluoro-:

No aspiration toxicity classification

Ethane, pentafluoro-:

No aspiration toxicity classification

Methane, difluoro-:

No aspiration toxicity classification

Ethane, 1,1,1-trifluoro-:

No aspiration toxicity classification

Experience with human exposure

Components:

Ethane, pentafluoro-:

Skin contact	:	Symptoms: Frostbite
Eye contact	:	Symptoms: Frostbite

Methane, difluoro-:

General Information : Contact can cause cold burns, frostbite and/or chemical burns with severe skin damage.

Ethane, 1,1,1-trifluoro-:

Skin contact : Symptoms: Frostbite

Eye contact : Symptoms: Frostbite

Further information

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Causes cardiac sensitization in dogs.

Remarks : Stress induced heart effects: irregular heart beat, rapid heart beat, and in some cases, sudden death. Reaction may occur in response to stress (natural adrenaline release) or administration of epinephrine.

No-Observed-Adverse-Effect Concentration (NOAEC): 5%

Ethane, pentafluoro-:

Causes cardiac sensitization in dogs.

Remarks : Stress induced heart effects: irregular heart beat, rapid heart beat, and in some cases, sudden death. Reaction may occur in response to stress (natural adrenaline release) or administration of epinephrine.

No-Observed-Adverse-Effect Concentration (NOAEC): 7%

Methane, difluoro-:

Cardiac sensitization not observed in dogs.

No-Observed-Adverse-Effect Concentration (NOAEC): 35%

Ethane, 1,1,1-trifluoro-:

Causes cardiac sensitization in dogs.

Remarks : Stress induced heart effects: irregular heart beat, rapid heart beat, and in some cases, sudden death. Reaction may occur in response to stress (natural adrenaline release) or administration of epinephrine.

No-Observed-Adverse-Effect Concentration (NOAEC): < 30%

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 980 mg/l Exposure time: 48 h
Toxicity to microorganisms	:	EC10 (Pseudomonas putida): > 730 mg/l Exposure time: 16 h

Ethane, 1,1,1-trifluoro-:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 109 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 300 mg/l Exposure time: 48 h

Persistence and degradability

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 3 % Exposure time: 28 d
Photodegradation	:	Test Type: Degradation in the atmosphere Remarks: in atmosphere

Ethane, pentafluoro-:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 5 % Exposure time: 28 d

Methane, difluoro-:

Biodegradability	:	Result: Not readily biodegradable.

Biodegradation: 5 %
Exposure time: 28 d

Ethane, 1,1,1-trifluoro-:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 3 - 10 %
Exposure time: 28 d
Remarks: (data for a similar material)

Bioaccumulative potential

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Partition coefficient: n-octanol/water : log Pow: 1.06 (77 °F / 25 °C)
pH: 6

Ethane, pentafluoro-:

Partition coefficient: n-octanol/water : log Pow: 1.48 (77 °F / 25 °C)
pH: 6.4

Methane, difluoro-:

Partition coefficient: n-octanol/water : log Pow: 0.21 (77 °F / 25 °C)

Ethane, 1,1,1-trifluoro-:

Partition coefficient: n-octanol/water : log Pow: 1.74 (68 °F / 20 °C)
pH: 6
Method: calculated

Mobility in soil

No data available

Other adverse effects

Components:

Ethane, 1,1,1,2-tetrafluoro-:

Ozone-Depletion Potential : 0

Ethane, pentafluoro-:

Ozone-Depletion Potential : 0
Remarks: Ozone depletion potential; ODP; (R-11 = 1)

Methane, difluoro-:

Ozone-Depletion Potential : 0
Remarks: Ozone depletion potential; ODP; (R-11 = 1)

Ethane, 1,1,1-trifluoro-:

Ozone-Depletion Potential : 0
Remarks: Ozone depletion potential; ODP; (R-11 = 1)

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Do not vent the container contents, or product residuals, to the atmosphere. Recover and reclaim unused contents or residuals as appropriate. Recovered/reclaimed product can be returned to an approved certified reclaimer or back to the seller depending on the material. Completely emptied disposable containers can be disposed of as recyclable steel. Returnable cylinders must be returned to seller.
Dispose of in accordance with federal, state and local regulations.
Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.
Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IMDG-Code

UN number : UN 3163
Proper shipping name : LIQUEFIED GAS, N.O.S. (1,1,1,2-TETRAFLUOROETHANE, PENTAFLUOROETHANE)
Class : 2.2
Packing group : Not assigned by regulation

Labels	:	2.2
EmS Code	:	F-C, S-V
Marine pollutant	:	no

National Regulations

49 CFR Road

UN/ID/NA number	:	UN 3163
Proper shipping name	:	Liquefied gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
Class	:	2.2
Packing group	:	Not assigned by regulation
Labels	:	Non-Flammable Gas
ERG Code	:	126
Marine pollutant	:	no

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

Chemical Inventory Status

US. Toxic Substances Control Act	TSCA	The components of this product are all on the Active TSCA Inventory.
Canadian Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL
China. Inventory of Existing Chemical Substances in China (IECSC)	IECSC (CN)	All components of this product are listed or exempted
Japan. ENCS - Existing and New Chemical Substances Inventory	ENCS (JP)	All components of this product are listed or exempted
Japan. ISHL - Inventory of Chemical Substances	ISHL (JP)	All components of this product are listed or exempted
Korea. Korean Existing Chemicals Inventory (KECI)	KECI (KR)	All components of this product are listed or exempted
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	PICCS (PH)	All components of this product are listed or exempted

Australian Inventory of Industrial Chemicals	AU AIICL	All components of this product are listed or exempted
Taiwan Chemical Substance Inventory (TCSI)	TCSI	All components of this product are listed or exempted

United States – Federal Regulations

SARA Title III – Section 302 Extremely Hazardous Chemicals:
The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

SARA Title III - Section 311/312 Hazard Categories:
Gases under pressure
Simple Asphyxiant

SARA Title III – Section 313 Toxic Chemicals:
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

The components in this product are either not CERCLA regulated, regulated but present in negligible concentrations, or regulated with no assigned reportable quantity.

United States – State Regulations

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

SECTION 16. OTHER INFORMATION

Latest Revision(s):

Reference number:	200005122
Date of Revision:	02/19/2026
Date Printed:	02/20/2026

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