1. PRODUCT AND COMPANY IDENTIFICATION

Company

Arkema Inc.
900 First Avenue
King of Prussia, Pennsylvania 19406

Fluorochemicals

Customer Service Telephone Number: (800) 245-5858
(Monday through Friday, 8:00 AM to 5:00 PM EST)

Emergency Information

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)

Product Information

Product name:	FORANE® 410A
Synonyms:	R-410A, HFC 410A, FORANE FX 41
Molecular formula:	Mixture
Chemical family:	Hydrofluorocarbon
Molecular weight:	72.59 g/mol
Product use:	Refrigerant

2. HAZARDS IDENTIFICATION

Emergency Overview

Color:	Clear - colourless
Physical state:	gaseous
Form:	Liquefied gas
Odor:	Slightly ether-like

***Classification of the substance or mixture:**
Gases under pressure, Liquefied gas, H280

*For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labelling

Hazard pictograms:

Signal word: **Warning**

Hazard statements:
H280 : Contains gas under pressure; may explode if heated.

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. May displace oxygen and cause rapid suffocation.

Precautionary statements:

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

Supplemental information:

Potential Health Effects:
Liquid : Contact with liquid or refrigerated gas can cause cold burns and frostbite. Vapor: Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. Central nervous system effects: headache, nausea, dizziness, drowsiness, loss of consciousness.
Stress induced heart effects: irregular heart beat, rapid heart beat, (severity of effects depends on extent of exposure).

Medical conditions aggravated by overexposure:
Heart disease or compromised heart function.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Wt/Wt	GHS Classification**
Ethane, pentafluoro-	354-33-6	50 %	H280
Methane, difluoro-	75-10-5	50 %	H220, H280
Ethane, pentafluoro-	354-33-6	>= 30 - < 60 %	H280

Methane, difluoro-	75-10-5	>= 30 - < 60 %	H220, H280

**For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

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

Skin:
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. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes:
Immediately flush eye(s) with plenty of water.

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

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

5. FIREFIGHTING MEASURES

Extinguishing media (suitable):
Use extinguishing measures to suit surroundings.

Protective equipment:
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).
Fire fighting equipment should be thoroughly decontaminated after use.

Further firefighting advice:
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.

Fire and explosion hazards:

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:
Hydrogen fluoride
Carbonyl halides
Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

In case of spill or leak:
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. 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.

7. HANDLING AND STORAGE

Handling

General information on handling:
Avoid breathing gas.
Avoid contact with skin, eyes and clothing.
Keep away from heat, sparks and flames.
Wear cold-insulating gloves/face shield/eye protection.
Do NOT change or force fit connections.
Keep container closed.
Use only with adequate ventilation.
Do not change or force fit connections.
Use equipment rated for cylinder pressure.
Use a backflow preventative device in piping.
Wash thoroughly after handling.
Close valve after each use and when empty.
Do not enter confined spaces unless adequately ventilated.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Emptied container retains vapor and product residue.
Improper disposal or reuse of this container may be dangerous and/or illegal.

Storage

General information on storage conditions:
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.

Storage stability – Remarks:
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.

Storage incompatibility – General:
Store separate from: Finely divided metals (aluminium, magnesium, zinc...)

Strong bases

Alkali metals

Alkaline earth metals

Strong oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Ethane, pentafluoro- (354-33-6)

US. OARS. WEELs Workplace Environmental Exposure Level Guide

Time weighted average	1,000 ppm (4,900 mg/m3)
Remarks:	Listed

Methane, difluoro- (75-10-5)

US. OARS. WEELs Workplace Environmental Exposure Level Guide

Time weighted average	1,000 ppm (2,200 mg/m3)
Remarks:	Listed

Only those components with exposure limits are printed in this section. Limits with skin contact designation above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required. Limits with a sensitizer designation above mean that exposure to this material may cause allergic reactions.

Engineering controls:
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.

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.

Skin protection:
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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Clear - colourless
Physical state:	gaseous
Form:	Liquefied gas
Odor:	Slightly ether-like
Odor threshold:	No data available
Flash point	Not applicable
Auto-ignition temperature:	No data available
Lower flammable limit (LFL):	None.
Upper flammable limit (UFL):	None.
pH:	Not applicable
Density:	No data available
Specific Gravity (Relative density):	1.06 (77 °F(25 °C))Water=1 (liquid)
Vapor pressure:	11,061 mmHg (70.0 °F (21.1 °C))
Vapor density:	2.52 kg/m3
Boiling point/boiling range:	-63.0 °F (-52.8 °C)
Freezing point:	No data available
Melting point:	No data available
Evaporation rate:	No data available

Solubility in water:	No data available
% Volatiles:	100 %
Molecular weight:	72.59 g/mol
Oil/water partition coefficient:	Not applicable
Thermal decomposition	Not applicable
Flammability:	See GHS Classification in Section 2

10. STABILITY AND REACTIVITY

Stability:
This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Materials to avoid:
Strong oxidizing agents
Strong acids
Alkaline materials

Conditions / hazards to avoid:
Heat

Hazardous decomposition products:
Thermal decomposition giving toxic and corrosive products :
Hydrogen fluoride
Carbonyl halides
Carbon oxides

11. TOXICOLOGICAL INFORMATION

Data on this material and/or its components are summarized below.

Data for Ethane, pentafluoro- (354-33-6)

Acute toxicity

Inhalation:
Practically nontoxic. (Rat) 4 h LC50 > 800000 ppm. (Gas)

Sensitization:
Causes cardiac sensitization. inhalation. (Dog) Stress induced heart effects: irregular heart beat, rapid heart beat, in some cases, sudden death (Reaction may occur in response to stress (natural adrenaline release) or administration of epinephrine.)

Repeated dose toxicity
Subchronic inhalation administration to Rat / No adverse systemic effects reported.

Genotoxicity

Assessment In Vitro:
No genetic changes were observed in laboratory tests using: bacteria, animal cells, human cells

Genotoxicity

Assessment In Vivo:
No genetic changes were observed in laboratory tests using: mice

Developmental toxicity

Exposure during pregnancy. inhalation (rat and rabbit) / No birth defects were observed.

Data for Methane, difluoro- (75-10-5)

Acute toxicity

Inhalation:
Practically nontoxic. (Rat) 4 h LC50 > 520000 ppm. signs: anesthetic effects, central nervous system depression

Sensitization:
Cardiac sensitization not observed. inhalation. (Dog) tremors

Repeated dose toxicity
Subchronic inhalation administration to Rat / No adverse effects reported.

Genotoxicity

Assessment In Vitro:
No genetic changes were observed in laboratory tests using: bacteria, animal cells, human cells

Genotoxicity

Assessment In Vivo:
No genetic changes were observed in a laboratory test using: mice

Developmental toxicity

Exposure during pregnancy. inhalation (rat and rabbit) / No birth defects were observed.

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway
Data on this material and/or its components are summarized below.

Data for Ethane, pentafluoro- (354-33-6)

Biodegradation:
Not readily biodegradable. (Closed Bottle test, 28 d) biodegradation 5 %

Octanol Water Partition Coefficient:
log Pow = 1.48

Global Warming Potential:
GWP 0.84 (Halocarbon global warming potential; HGWP; (R-11 = 1))
GWP 3,450 (Global warming potential with respect to CO2 (time horizon 100 years))

Ozone Depletion Potential:
ODP 0.001 (Ozone depletion potential; ODP; (R-11 = 1))

Data for Methane, difluoro- (75-10-5)

Biodegradation:
Not readily biodegradable. (28 d) biodegradation 5 %

Octanol Water Partition Coefficient:
log Pow = 0.21

Global Warming Potential:
GWP 543 (Global warming potential with respect to CO2 (time horizon 100 years))

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

Ecotoxicology
No data are available.

13. DISPOSAL CONSIDERATIONS

Waste disposal:
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.

14. TRANSPORT INFORMATION

US Department of Transportation (DOT)

UN Number	:	3163
Proper shipping name	:	Liquefied gas, n.o.s.
Technical name	:	(Pentafluoroethane, Difluoromethane)
Class	:	2.2
Marine pollutant	:	no

International Maritime Dangerous Goods Code (IMDG)

UN Number	:	3163
Proper shipping name	:	LIQUEFIED GAS, N.O.S.
Technical name	:	(PENTAFLUOROETANO, DIFLUOROMETHANE)
Class	:	2.2
Marine pollutant	:	no

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS	EINECS	Conforms to
US. Toxic Substances Control Act	TSCA	The components of this product are all on the TSCA Inventory.
Australia. Industrial Chemical (Notification and Assessment) Act	AICS	Conforms to
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL.
Japan. Kashin-Hou Law List	ENCS (JP)	Conforms to
Korea. Existing Chemicals Inventory (KECI)	KECI (KR)	Conforms to
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	PICCS (PH)	Conforms to
China. Inventory of Existing Chemical Substances	IECSC (CN)	Conforms to

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:
Acute Health Hazard, Sudden Release of Pressure Hazard

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

New Jersey Right to Know

Chemical Name	CAS-No.
Methane, difluoro-	75-10-5

Pennsylvania Right to Know

Chemical Name	CAS-No.
Ethane, pentafluoro-	354-33-6
Methane, difluoro-	75-10-5

Pennsylvania Right to Know – Environmentally Hazardous Substance(s)

Chemical Name	CAS-No.
Methane, difluoro-	75-10-5

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.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.

Miscellaneous:

Other information: A significant new activity notice (SNAC notice) has been issued for Difluoromethane (HFC-32). It is the responsibility of the users of the substance to be aware of and comply with the SNAC notice and to submit a SNAC notification to Environment Canada prior to the commencement of a significant new activity associated with the substance.

Latest Revision(s):

Reference number: 000000057865
Date of Revision: 05/09/2015
Date Printed: 05/09/2015

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