

SAFETY DATA SHEET



FORANE® 32

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® 32
Synonyms: Not available
Molecular formula: CH₂F₂
Chemical family: Hydrofluorocarbon
Molecular weight: 52.02 g/mol
Product use: Low temperature refrigerant

SECTION 2: HAZARDS IDENTIFICATION

Emergency Overview

Color: Clear - colourless
Physical state: gaseous
Form: Liquefied gas
Odor: Ether-like (slightly)

***Classification of the substance or mixture:**

Flammable gases, Category 1, H220
Gases under pressure, Liquefied gas, H280

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

GHS-Labeling

Hazard pictograms:



Signal word:

Danger**Hazard statements:**

H220 : Extremely flammable gas.

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 displace oxygen and cause rapid suffocation.

May cause headache, nausea, dizziness, drowsiness, loss of consciousness.

Precautionary statements:**Prevention:**

P210 : Keep away from heat, sparks, open flames, hot surfaces. No smoking.

Response:

P377 : Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 : Eliminate all ignition sources if safe to do so.

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: 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.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Wt/Wt	GHS Classification**
Methane, difluoro-	75-10-5	>= 99.9 %	H220, H280

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

SECTION 4: FIRST AID MEASURES**4.1. Description of necessary 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. Remove contaminated clothing and shoes. 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.

4.2. Most important symptoms and effects, both acute and delayed:

For most important symptoms and effects (acute and delayed), see Section 2 (Hazard Statements and Supplemental Information if applicable) and Section 11 (Toxicology Information) of this SDS.

4.3. Indication of any immediate medical attention and special treatment needed:

Unless otherwise noted in Notes to Physician, no specific treatment noted; treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

SAFETY DATA SHEET



FORANE® 32

Extinguishing media (suitable):

Dry chemical, Water spray, Carbon dioxide (CO2)

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).

Further firefighting advice:

Stop the flow of gas if possible.

Fight fire with large amounts of water from a safe distance.

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:

hydrofluoric acid

Carbon oxides

Carbonyl halides

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, Emergency procedures, Methods and materials for containment/clean-up:

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.

Protective equipment:

Appropriate personal protective equipment is set forth in Section 8.

SECTION 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.
Keep container closed.
Use only with adequate ventilation.
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 change or force fit connections.
Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
Container hazardous when empty.
Follow label warnings even after container is emptied.
Do not enter confined spaces unless adequately ventilated.
RESIDUAL GASES MAY EXPLODE ON IGNITION.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
Improper disposal or reuse of this container may be dangerous and/or illegal.
Emptied container retains vapor and product residue.
Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

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. Ensure that all storage and handling equipment is properly grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate when transferring material. All metal and groundable storage containers, including but not limited to drums, cylinders, Returnable Intermodal Bulk Containers (RIBCs) and Class C Flexible Intermodal Bulk Containers (FIBCs) must be bonded and grounded during filling and emptying operations. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

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 (aluminum, magnesium...)
Alkaline earth metals
Alkali metals
Strong bases
Strong oxidizing agents

SAFETY DATA SHEET



FORANE® 32

Temperature tolerance – Do not store above:
113 °F (45 °C)

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Methane, difluoro- (75-10-5)

US. OARS. WEELs Workplace Environmental Exposure Level Guide, as amended

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. Consult ACGIH ventilation manual, NFPA Standard 91 and NFPA Standard 654 for design of exhaust system and safe handling.

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 thoroughly after handling. Wash contaminated clothing and clean protective equipment before reuse.

Eye protection:

Use good industrial practice to avoid eye contact.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

SAFETY DATA SHEET



FORANE® 32

Color:	Clear - colourless
Physical state:	gaseous
Form:	Liquefied gas
Odor:	Ether-like (slightly)
Odor threshold:	No data available
Flash point	Not applicable
Auto-ignition temperature:	986 °F (530 °C) (Method: Standard A15 (D. 92/69/EEC))
Lower flammable limit (LFL):	14.4 %(V)
Upper flammable limit (UFL):	31.0 %(V)
pH:	Not applicable
Density:	961 kg/m ³ (77 °F (25 °C)) (12.675 mmHg))liquid
Specific Gravity (Relative density):	No data available
Vapor pressure:	11,429 mmHg (70.0 °F (21.1 °C))
Vapor density:	2.1 kg/m ³ (77 °F (25 °C)) (Method: calculated) 760 mmHg
Boiling point/boiling range:	-60.9 °F (-51.6 °C) 760 mmHg
Melting point/range:	-213 °F (-136 °C)760 mmHg
Freezing point:	No data available.
Evaporation rate:	No data available
Solubility in water:	1.68 g/l 77 °F (25 °C)
Solubility in other solvents: [qualitative and quantitative]	Soluble in: Alcohol
Viscosity, dynamic:	Not applicable
% Volatiles:	100 %

Product code: 04132

Version 3.5

Issued on: 06/30/2022

Page: 7 / 12

FORANE® 32

Molecular weight:	52.02 g/mol
Oil/water partition coefficient:	log Pow: = 0.2177 °F (25 °C) (Method: OECD Test Guideline 107)
Thermal decomposition:	No data available
Critical point:	Critical pressure: 43725.00 mmHg Critical temperature: 173.1 °F (78.4 °C)
Flammability:	See GHS Classification in Section 2 if applicable

SECTION 10: STABILITY AND REACTIVITY**Stability:**

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

Hazardous reactions:

None known.

Materials to avoid:

Alkaline earth metals
Finely divided metals (aluminum, magnesium...)
Alkali metals
Strong bases
Strong oxidizing agents

Conditions / hazards to avoid:

Avoid contact with flames and red hot metallic surfaces Heat

Hazardous decomposition products:

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

SECTION 11: TOXICOLOGICAL INFORMATION

Data on this material and/or a similar material are summarized below.

Data for FORANE® 32**Acute toxicity****Inhalation:**

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

FORANE® 32

Sensitization:

Cardiac sensitization not observed. (dog)

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

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.

SECTION 12: ECOLOGICAL INFORMATION**Chemical Fate and Pathway**

Data on this material and/or a similar material are summarized below.

Data for FORANE® 32**Biodegradation:**

Not readily biodegradable. (28 d) biodegradation 5 %

Octanol Water Partition Coefficient:

log Pow: = 0.21, at 77 °F (25 °C)

Global Warming Potential:

GWP 675 (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.

SECTION 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

SAFETY DATA SHEET



FORANE® 32

waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

SECTION 14: TRANSPORT INFORMATION
US Department of Transportation (DOT)

UN Number : 3252
Proper shipping name : Difluoromethane
Class : 2.1
Marine pollutant : no

International Maritime Dangerous Goods Code (IMDG)

UN Number : 3252
Proper shipping name : DIFLUOROMETHANE
Class : 2.1
Marine pollutant : no

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

Product code: 04132

Version 3.5

Issued on: 06/30/2022

Page: 10 / 12

SAFETY DATA SHEET



FORANE® 32

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, Fire 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

No components are subject to the New Jersey Right to Know Act.

Pennsylvania Right to Know

<u>Chemical name</u>	<u>CAS-No.</u>
Methane, difluoro-	75-10-5

Pennsylvania Right to Know – Environmentally Hazardous Substance(s)

<u>Chemical name</u>	<u>CAS-No.</u>
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.

SECTION 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.

SAFETY DATA SHEET



FORANE® 32

Miscellaneous:

Other information: Refer to National Fire Protection Association (NFPA) Codes 30, 70, 77, and 497 and OSHA 29 CFR 1910.106, for safe handling.

Latest Revision(s):

Reference number: 200005091
Date of Revision: 06/30/2022
Date Printed: 07/01/2022

FORANE® is a registered trademark of Arkema Inc.

The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, ARKEMA expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information;

NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. The user should thoroughly test any application before commercialization. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement. See SDS for Health & Safety Considerations.

Arkema has implemented a Medical Policy regarding the use of Arkema products in Medical Devices applications that are in contact with the body or circulating bodily fluids (<http://www.arkema.com/en/social-responsibility/responsible-product-management/medical-device-policy/index.html>) Arkema has designated Medical grades to be used for such Medical Device applications. Products that have not been designated as Medical grades are not authorized by Arkema for use in Medical Device applications that are in contact with the body or circulating bodily fluids. In addition, Arkema strictly prohibits the use of any Arkema products in Medical Device applications that are implanted in the body or in contact with bodily fluids or tissues for greater than 30 days. The Arkema trademarks and the Arkema name shall not be used in conjunction with customers' medical devices, including without limitation, permanent or temporary implantable devices, and customers shall not represent to anyone else, that Arkema allows, endorses or permits the use of Arkema products in such medical devices.

It is the sole responsibility of the manufacturer of the medical device to determine the suitability (including biocompatibility) of all raw materials, products and components, including any medical grade Arkema products, in order to ensure that the final end-use product is safe for its end use; performs or functions as intended; and complies with all applicable legal and regulatory requirements (FDA or other national drug agencies) It is the sole responsibility of the manufacturer of the medical device to conduct all necessary tests and inspections and to evaluate the medical device under actual end-use requirements and to adequately advise and warn purchasers, users, and/or learned intermediaries (such as physicians) of pertinent risks and fulfill any postmarket surveillance obligations. Any decision regarding the appropriateness of a particular Arkema material in a particular medical device should be based on the judgment of the manufacturer, seller, the competent authority, and the treating physician.