

FORANE® 11**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® 11
Synonyms: CFC-11
Molecular formula: CC13F
Chemical family: Chlorofluorocarbon
Molecular weight: 137.38 g/mol
Product use: Refrigerant

2. HAZARDS IDENTIFICATION**Emergency Overview**

Color: Clear - colourless
Physical state: liquid
Odor: Ether-like (slightly)

***Classification of the substance or mixture:**
Hazardous to the ozone layer, Category 1, H420

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

GHS-Labeling

Hazard pictograms:



FORANE® 11

Signal word: **Warning**

Hazard statements:

H420 : Harms public health and the environment by destroying ozone in the upper atmosphere.

Supplemental Hazard Statements:

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:

Disposal:

P502 : Refer to manufacturer/ supplier for information on recovery/ recycling.

Supplemental information:

Potential Health Effects:

Liquid : Rapid evaporation of the liquid may cause frostbite. Vapor: 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.

Medical conditions aggravated by overexposure:

Heart disease or compromised heart function.

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name | CAS-No. | Wt/Wt | GHS Classification** |
|------------------------|---------|-------|----------------------|
| Trichlorofluoromethane | 75-69-4 | 100 % | H420 |

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

4. FIRST AID MEASURES

Inhalation:

FORANE® 11

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:

If swallowed, DO NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.

Notes to physician:

Do not give drugs from adrenaline-ephedrine group.

5. FIREFIGHTING MEASURES**Extinguishing media (suitable):**

Water spray, Carbon dioxide (CO₂), Dry chemical

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:

Fire fighting equipment should be thoroughly decontaminated after use.
Cool closed containers exposed to fire with water spray.

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:

Carbon oxides
Hazardous organic compounds
hydrofluoric acid
Carbonyl halides

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 vapor or mist.
Avoid contact with skin, eyes and clothing.
Wear cold-insulating gloves/face shield/eye protection.
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.
Do not enter confined spaces unless adequately ventilated.
Close valve after each use and when empty.
Emptied container retains vapor and product residue.
Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Storage**General information on storage conditions:**

Store in well ventilated area away from heat and 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: Alkaline earth metals

Finely divided metals (aluminium, magnesium, zinc...)

Strong oxidizing agents

Strong bases

Alkali metals

FORANE® 11

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Trichlorofluoromethane (75-69-4)

US. ACGIH Threshold Limit Values

| | |
|---------------------|-----------|
| Ceiling Limit Value | 1,000 ppm |
|---------------------|-----------|

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

| | |
|------|-------------------------|
| PEL: | 1,000 ppm (5,600 mg/m3) |
|------|-------------------------|

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 vapor or mist. 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 or other conditions where there may be a potential for a significant exposure, use a NIOSH certified powered air-purifying respirator or a continuous flow supplied air-purifying respirator with a loose fitting hood or helmet and a HEPA filter having an APF of 1000. 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.

Eye protection:

Use good industrial practice to avoid eye contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|------------------------|-----------------------|
| Color: | Clear - colourless |
| Physical state: | liquid |
| Odor: | Ether-like (slightly) |

FORANE® 11

| | |
|-----------------------------------------|----------------------------------------|
| Odor threshold: | No data available |
| Flash point | Not applicable |
| Auto-ignition temperature: | Not applicable |
| Lower flammable limit (LFL): | None. |
| Upper flammable limit (UFL): | None. |
| pH: | Not applicable |
| Density: | 1.48 g/cm ³ (77 °F (25 °C)) |
| Vapor pressure: | 687.81 mmHg (70.0 °F (21.1 °C)) |
| Vapor density: | No data available |
| Boiling point/boiling range: | 74.8 °F (23.8 °C) |
| Freezing point: | -168 °F (-111 °C) |
| Evaporation rate: | No data available |
| Solubility in water: | Slightly soluble |
| % Volatiles: | 100 % |
| Molecular weight: | 137.38 g/mol |
| Oil/water partition coefficient: | No data available |
| Thermal decomposition | No data available |
| 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:

- Alkaline earth metals
- Finely divided metals (aluminium, magnesium, zinc...)
- Strong oxidizing agents
- Alkali metals
- Strong bases

FORANE® 11**Conditions / hazards to avoid:**

Heat

Hazardous decomposition products:

Thermal decomposition giving toxic and corrosive products :

Halogen acids (HCl and HF)

Carbon oxides

Carbonyl halides

hydrofluoric acid

11. TOXICOLOGICAL INFORMATION**Data for FORANE® 11****Acute toxicity****Oral:**

No deaths occurred. (rat) LD0 > 3,725 mg/kg.

Inhalation:

Practically nontoxic. (rat) 4 h LC50 = 26200 ppm. signs: Cough, breathing difficulties (Gas)

Skin Irritation:

Not irritating. (rabbit)

Eye Irritation:

Not irritating. (rabbit) (liquid)

Causes mild eye irritation. (rabbit) (Aerosol)

Sensitization:

Causes cardiac sensitization. Inhalation. (dog, rat, mouse and monkey) Stress induced heart effects: signs: 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

Repeated inhalation administration to rat / affected organ(s): brain, spleen, liver, lung / signs: changes in organ structure or function

Chronic oral administration to rat / No adverse systemic effects reported. (applied in low hazard matrix)

Carcinogenicity

Chronic oral, inhalation administration to rat and mouse / signs: No increase in tumor incidence was reported.

Genotoxicity**Assessment in Vitro:**

No genetic changes were observed in laboratory tests using: bacteria, animal cells

FORANE® 11

Assessment in Vivo:

No genetic changes were observed in a laboratory test using: rats

Developmental toxicity

Exposure during pregnancy. inhalation (rat) / No birth defects were observed. (delays in development)
 Exposure during pregnancy. inhalation (rabbit) / No birth defects were observed. (levels produced toxic effects in the mothers and offspring)

Human experience

Inhalation:

Heart: 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.. (based on reports of occupational exposure to workers)

Skin contact:

Skin: contact dermatitis. (repeated or prolonged exposure) Isolated case reports after exposure to a mixture containing this substance.

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway

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

Data for FORANE® 11

Biodegradation:

Not readily biodegradable. (27 d) biodegradation < 10 %

Octanol Water Partition Coefficient:

log Pow = 2.53

Ozone Depletion Potential:

ODP 1 (Ozone depletion potential; ODP; (R-11 = 1))

Ecotoxicology

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

Data for FORANE® 11

Aquatic toxicity data:

Practically nontoxic. Salmo gairdneri 96 h LC50 = 190 mg/l

Aquatic invertebrates:

Practically nontoxic. Daphnia magna (Water flea) 48 h EC50 = 130 mg/l

Microorganisms:

Bacteria under anaerobic conditions 24 h Toxicity threshold > 65 mg/l

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

FORANE® 11

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): not regulated

International Maritime Dangerous Goods Code (IMDG): not regulated

15. REGULATORY INFORMATION

Chemical Inventory Status

| | | |
|--------------------------------------------------------------------|------------|---------------------------------------------------------------|
| EU. EINECS | EINECS | Conforms to |
| United States TSCA Inventory | TSCA | The components of this product are all on the 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) | Conforms to |
| Japan. ENCS - Existing and New Chemical Substances Inventory | ENCS (JP) | Conforms to |
| Japan. ISHL - Inventory of Chemical Substances | ISHL (JP) | Conforms to |
| Korea. Korean Existing Chemicals Inventory (KECI) | KECI (KR) | Conforms to |
| Philippines Inventory of Chemicals and Chemical Substances (PICCS) | PICCS (PH) | Conforms to |
| Australia Inventory of Chemical Substances (AICS) | AICS | 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

FORANE® 11

SARA Title III – Section 313 Toxic Chemicals:

| <u>Chemical Name</u> | <u>CAS-No.</u> | <u>De minimis concentration</u> | <u>Reportable threshold:</u> |
|------------------------|----------------|---------------------------------|-------------------------------------------------------------------------------------------------------|
| Trichlorofluoromethane | 75-69-4 | 1.0 % | 25000 lbs (Manufacturing and processing) 10000 lbs (Otherwise used (non-manufacturing/processing)) |

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

| <u>Chemical Name</u> | <u>CAS-No.</u> | <u>Reportable quantity</u> |
|------------------------|----------------|----------------------------|
| Trichlorofluoromethane | 75-69-4 | 5000 lbs |

United States – State Regulations

New Jersey Right to Know

| <u>Chemical Name</u> | <u>CAS-No.</u> |
|------------------------|----------------|
| Trichlorofluoromethane | 75-69-4 |

Pennsylvania Right to Know

| <u>Chemical Name</u> | <u>CAS-No.</u> |
|------------------------|----------------|
| Trichlorofluoromethane | 75-69-4 |

Pennsylvania Right to Know – Environmentally Hazardous Substance(s)

| <u>Chemical Name</u> | <u>CAS-No.</u> |
|------------------------|----------------|
| Trichlorofluoromethane | 75-69-4 |

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.

H420 Harms public health and the environment by destroying ozone in the upper atmosphere.

Latest Revision(s):

| | |
|-------------------|--------------|
| Reference number: | 000000039837 |
| Date of Revision: | 05/09/2015 |
| Date Printed: | 05/09/2015 |

FORANE® 11

FORANE® is a registered trademark of Arkema Inc.

Arkema Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use are beyond the control of Arkema Inc., Arkema Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.