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® 141b
Synonyms: R-141b
Molecular formula: CH3CCl2F
Chemical family: Hydrochlorofluorocarbon
Molecular weight: 116.9 g/mol
Product use: Foam blowing agent

2. HAZARDS IDENTIFICATION

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

***Classification of the substance or mixture:**
Chronic aquatic toxicity, Category 3, H412
Hazardous to the ozone layer, Category 1, H420

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

GHS-Labelling

Hazard pictograms:

Signal word: **Warning**

Hazard statements:

H412 : Harmful to aquatic life with long lasting effects.
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 headache, nausea, dizziness, drowsiness, loss of consciousness. May cause cardiac sensitization/cardiac arrhythmia. May displace oxygen and cause rapid suffocation. May cause frostbite.

Precautionary statements:

Prevention:

P273 : Avoid release to the environment.

Disposal:

P501 : Dispose of contents/ container to an approved waste disposal plant.
P502 : Refer to manufacturer/ supplier for information on recovery/ recycling.

Supplemental information:

Potential Health Effects:

Liquid : Rapid evaporation of the liquid may cause frostbite. Prolonged or repeated contact may dry skin and cause irritation. 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**
Ethane, 1,1-dichloro-1-fluoro-	1717-00-6	100 %	H420, H412

**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. Remove contaminated clothing and shoes. 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), Foam, 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:
Keep containers and surroundings cool with water spray.
Fire fighting equipment should be thoroughly decontaminated after use.
Water mist should be used to reduce vapor concentrations in air.
Forane 141b does not exhibit a flash point at room temperature when tested according to NFPA 30 (closed-cup test method); the vapors are rich with Forane 141b, above the upper limit, and will not support combustion. In an open area at room temperature, the concentration can fall into the flammable range and ignite in the presence of a strong ignition source. Additional care must be taken in recognition of the ability of the vapor to travel to an ignition source and ignite since they are heavier than air.

Do not allow run-off from fire fighting to enter drains or water courses.

Fire and explosion hazards:
May decompose on contact with flames or extremely hot metal surfaces to produce toxic and corrosive products.
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
Hydrogen fluoride
hydrogen chloride
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:
Do not breathe vapor or mist.
Avoid contact with the skin, eyes and clothing.
Wear cold-insulating gloves/face shield/eye protection.
Keep container closed.
Use only with adequate ventilation.
Use a backflow preventative device in piping.
Wash thoroughly after handling.
Do not change or force fit connections.
Do not enter confined spaces unless adequately ventilated.
Emptied container retains 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. Store in cool, dry, well ventilated area away from sources of ignition such as flame, sparks and static electricity.

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

Alkaline earth metals

Strong oxidizing agents

Strong bases

Alkali metals

Temperature tolerance – Do not store above:
120 °F (49 °C)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

Ethane, 1,1-dichloro-1-fluoro- (1717-00-6)

US. OARS. WEELs Workplace Environmental Exposure Level Guide

Time weighted average	500 ppm (2,370 mg/m3)
Short Term Exposure Limit (STEL):	3,000 ppm (14,220 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:
Do not breathe 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 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:	liquid

Odor:	Ether-like (slightly)
Odor threshold:	Not applicable
Flash point	None.
Auto-ignition temperature:	1,022 °F (550 °C)
Lower flammable limit (LFL):	7.6 %(V)
Upper flammable limit (UFL):	17.7 %(V)
pH:	Not applicable
Density:	not determined
Specific Gravity (Relative density):	1.25 (50 °F(10 °C))
Vapor pressure:	517.149 mmHg (68 °F (20 °C))
Vapor density:	4 kg/m3
Boiling point/boiling range:	90 °F (32 °C)
Freezing point:	-154.3 °F (-103.5 °C)
Evaporation rate:	Not applicable
Solubility in water:	slightly soluble
% Volatiles:	100 %
Molecular weight:	116.9 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
Alkaline earth metals

Finely divided metals (aluminium, magnesium, zinc...)
Strong bases
Alkali metals

Conditions / hazards to avoid:
Heat

Hazardous decomposition products:

Thermal decomposition giving toxic and corrosive products :
Carbonyl halides
Carbon oxides
Halogen acids (HCl and HF)

11. TOXICOLOGICAL INFORMATION

Data for FORANE® 141b

Acute toxicity

Oral:
Practically nontoxic. (Rat) LD50 > 5,000 mg/kg.

Dermal:
No deaths occurred. (Rat) LD0 > 2,000 mg/kg.

Inhalation:
Practically nontoxic. (Rat) 4 h LC50 = 62000 ppm. (Gas)

Skin Irritation:
Not irritating. (Rabbit) (24 h)

Eye Irritation:
Causes mild eye irritation. (Rabbit)

Skin Sensitization:
Not a sensitizer. Repeated skin exposure. (Guinea pig) No skin allergy was observed

Repeated dose toxicity
Repeated inhalation administration to Rat / signs: changes in body weight, blood chemistry changes

Carcinogenicity
Chronic inhalation administration to male rat / affected organ(s): testes / signs: Increased incidence of tumors was reported. / (The observed tumors do not appear to be relevant for men.)

Genotoxicity

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

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

Developmental toxicity

Exposure during pregnancy. inhalation (Rabbit) / No birth defects were observed.
Exposure during pregnancy. inhalation (Rat) / No birth defects were observed. (levels produced toxic effects in the mothers and offspring)

Reproductive effects

Multiple generation reproduction test. inhalation (Rat) / No toxicity to reproduction. / (smaller litter sizes)

12. ECOLOGICAL INFORMATION

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

Data for FORANE® 141b

Biodegradation:
Not readily biodegradable. (28 d) biodegradation 2 - 3 %

Bioaccumulation:

Slight potential to bioaccumulate.

Octanol Water Partition Coefficient:
log Pow = 2.3

Ozone Depletion Potential:
ODP 0.11 (Ozone depletion potential; ODP; (R-11 = 1))

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

Data for FORANE® 141b

Aquatic toxicity data:
Practically nontoxic. Danio rerio (zebra fish) 96 h LC50 = 126 mg/l

Aquatic invertebrates:
Harmful. Daphnia magna (Water flea) 48 h EC50 = 31.2 mg/l

Algae:
Scenedesmus capricornutum (fresh water algae) 72 h NOEC > 44 mg/l

Chronic toxicity to aquatic plants:
Selenastrum capricornutum 96 d NOEC (Growth inhibition) > 44 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 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.

Take appropriate measures to prevent release to the environment.

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	The product contains ELINCS substances., Does not conform
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

SARA Title III – Section 313 Toxic Chemicals:
The following components are subject to reporting levels established by SARA Title III, Section 313:

Chemical Name	CAS-No.	De minimis concentration	Reportable threshold:
Ethane, 1,1-dichloro-1-fluoro-	1717-00-6	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):

Chemical Name	CAS-No.	Reportable quantity
Ethane, 1-chloro-1,1-difluoro-	75-68-3	100 lbs
Trichlorofluoromethane	75-69-4	5000 lbs

United States – State Regulations

New Jersey Right to Know

Chemical Name	CAS-No.
Ethane, 1,1-dichloro-1-fluoro-	1717-00-6

Pennsylvania Right to Know

Chemical Name	CAS-No.
Ethane, 1,1-dichloro-1-fluoro-	1717-00-6

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.

H412 Harmful to aquatic life with long lasting effects.
H420 Harms public health and the environment by destroying ozone in the upper atmosphere.

Miscellaneous:

Other information: This MSDS covers the following grades: Solvent

Latest Revision(s):

Reference number: 000000042202
Date of Revision: 05/09/2015
Date Printed: 05/09/2015

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