



MATERIAL

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Product:

FORANE 410A

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SDS No.: 002606-001 (Version 2.0)

Date 24.07.2009 (Cancel and replace : 25.07.2008)

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Identification of the preparation : FORANE 410A

Recommended use : Refrigerant

Supplier : Arkema France
FLUORES
420 rue d'Estienne d'Orves
92705 Colombes Cedex
France
Téléphone : +33 (0)1 49 00 80 80
Télécopie : +33 (0)1 49 00 83 96
http://www.arkema.com

E-mail address : pars-drp-fds@arkema.com

Emergency telephone : +33 1 49 00 77 77

2. HAZARDS IDENTIFICATION

Most important hazards:

Environmental Effects : Not readily biodegradable

Physical and chemical hazards : Thermal decomposition giving toxic and corrosive products
Decomposition products: See chapter 10

Additional information : This preparation is not classified as dangerous according to Directive 1999/45/EC.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components :

Chemical Name *)	EC-No.	CAS-No.	Concentration	Classification
Difluoromethane	200-839-4	75-10-5	50 %	F+; R12
Pentafluoroethane	206-557-8	354-33-6	50 %	-

*) See chapter 14 for Proper Shipping Name

For the full text of the R phrases mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

Inhalation : Move patient from contaminated area to fresh air.
Oxygen or artificial respiration if needed.
In case of persistent problems :
Consult a physician.

Skin contact : Wash off with plenty of water.
Frostbite : treat as thermal burns

Eye contact : Wash immediately, abundantly and thoroughly with water
If irritation persists, consult an ophthalmologist

Ingestion : Hospitalise

Protection of first-aiders : If entering a saturated atmosphere, wear a self contained breathing apparatus

Notes to physician : Do not administer catecholamines (because of the cardiac effect caused by the product)

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5. FIRE-FIGHTING MEASURES

- Specific hazards : Thermal decomposition giving toxic and corrosive products :
Hydrogen fluoride
Carbon oxides
One of the components of this preparation gives flammable mixtures with air
- Specific methods : Cool containers / tanks with water spray.
Prohibit all sources of sparks and ignition - Do not smoke.
- Special protective equipment for fire-fighters : Wear self-contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Avoid contact with the skin and the eyes.
Avoid inhalation of vapours
In enclosed areas : ventilate or wear a self-contained breathing apparatus (risk of anoxia)
Remove all sources of ignition.
Do not smoke.
- Environmental precautions : Avoid release to the environment.

7. HANDLING AND STORAGE

Handling

- Technical measures/Precautions : Storage and handling precautions applicable to products:
pressurised liquified gas
Provide appropriate exhaust ventilation at machinery.
Provide self-contained breathing apparatus nearby (for emergency intervention).
Provide showers, eye-baths.
Well ventilate empty vats and tanks before entering

- Safe handling advice : Prohibit ignition sources and contact with hot surfaces - DO NOT SMOKE

Storage

- Technical measures/Storage conditions : Store at room temperature in the original container.
Keep away from open flames, hot surfaces and sources of ignition.
Keep away from heat and sources of ignition. Do not smoke
Keep in a cool, well-ventilated place.
Protect full containers from sources of heat to avoid overpressurization

Packaging material

- Recommended : Ordinary steel
- Materials to avoid : Alloys containing more than 2% of magnesium
Plastic materials

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- General protective measures : Provide sufficient air exchange and/or exhaust in work rooms.

Control parameters

Exposure Limit Values

Pentafluoroethane

Source	Date	Value type	Value (ppm)	Value (mg/m3)	Remarks
ARKEMA		STEL	1.000	4.900	Value recommended by the "Exposure Limit Value Committee" of ARKEMA
WEEL	2006	TWA	1.000	4.900	-
WEEL	2006		-	-	Listed

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Difluoromethane

Source	Date	Value type	Value (ppm)	Value (mg/m3)	Remarks
ARKEMA		TWA	1.000	2.130	Value recommended by the "Exposure Limit Value Committee" of ARKEMA
WEEL	2006	TWA	1.000	2.200	-
WEEL	2006		-	-	Listed

Personal protective equipment

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.

Hand protection : Gloves

Eye protection : Safety glasses

Hygiene measures : Avoid exposure to vapor.
Do not smoke.
Avoid contact with the skin and the eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C) : gaseous

Form : Liquefied gas

Colour : colourless

Odour : Slightly ether-like

pH : not applicable

Boiling point/boiling range : -52,6 °C

Flash point : Has no measurable flash point up to the boiling point

Vapour pressure : 1,68 MPa (25 °C)
3,11 MPa (50 °C)
4,31 MPa (65 °C)

Vapour density : 3,0 kg/m3 (25 °C)

Density : 1.063 kg/m3 (25 °C)
912 kg/m3 (50 °C)

Solubility:

- Water solubility : 0,48 g/l (25 °C)
Solubility of water in the product

Partition coefficient: n-octanol/water : DIFLUOROMETHANE :
log Kow : 0,21 (OECD Guideline 107)
PENTAFLUOROETHANE :
log Kow : 1,48 (measured)

Henry constant : DIFLUOROMETHANE:
Henry constant: 29,60E+03 Pa.m³/mol
PENTAFLUOROETHANE:
Henry constant: 309E+03 Pa.m³/mol

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Critical point : Critical pressure: 4,9 MPa
Critical temperature: 71 °C

10. STABILITY AND REACTIVITY

Conditions to avoid : Keep away from heat and sources of ignition.
Avoid contact with flames and red hot metallic surfaces

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

Further information : The product is stable under normal handling and storage conditions

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Inhalation : Effects of breathing high concentrations of vapour may include:
headache
Drowsiness
Dizziness
As with other volatile aliphatic halogenated compounds, through vapour accumulation and/or inhalation of large quantities, the product can cause :
Loss of consciousness and cardiac disorders aggravated by stress and lack of oxygen, risk of mortality
Experimental effects on animals :
Slightly harmful by inhalation
No mortality/4 h/rat: 500000 ppm

Local effects

Skin contact : Ejection of liquefied gas : frostbite possible

Eye contact : Ejection of liquefied gas : frostbite possible

Repeated dose toxicity

: According to its composition :
3 Months / rat
Studies of prolonged inhalation in animals have not shown sub-chronic toxic effects
No Observed Adverse Effect Level (NOAEL): 50000 ppm

Specific effects

Genotoxicity : According to its composition :

In vitro : According to available experimental data
Not genotoxic

Reproductive toxicity

Foetal development : According to its composition :
- By inhalation/rat, rabbit
According to available experimental data
Absence of toxic effects for foetal development at non toxic maternal doses

12. ECOLOGICAL INFORMATION

According to its composition :
Not readily biodegradable
Not bioaccumulable.

Mobility

: DIFLUOROMETHANE :
In soils and sediments:
Slight adsorption:
log Koc 1,5 (calculated)

PENTAFLUOROETHANE :
In aqueous environment:
rapid evaporation:
(estimation)

Volatilization 1/2 life time: 3,2 h

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In soils and sediments:
Slight adsorption:
log Koc 1,3 - 1,7

DIFLUOROMETHANE:
Henry constant: 29,60E+03 Pa.m³/mol

PENTAFLUOROETHANE:
Henry constant: 309E+03 Pa.m³/mol

Persistence and degradability
In water

: DIFLUOROMETHANE :
Not readily biodegradable:
5 % after 28 d
(OECD Guideline 301 D)

PENTAFLUOROETHANE :
Not readily biodegradable:
5 % after 28 d
(OECD Guideline 301 D)

in air

: DIFLUOROMETHANE :
Degradation by radicals OH :
Direct photolysis (Half-life) : 1.472 d

PENTAFLUOROETHANE :
Degradation in the troposphere :
Overall half-life time: 28,3 y
(estimation)

Bioaccumulation

: DIFLUOROMETHANE :
Practically not bioaccumulable
log Kow : 0,21 (OECD Guideline 107)

PENTAFLUOROETHANE :
Practically not bioaccumulable
log Kow : 1,48 (measured)

13. DISPOSAL CONSIDERATIONS

Disposal of product : Recycle or incinerate at an approved waste disposal site
In accordance with local and national regulations.

14. TRANSPORT INFORMATION

ADR

UN Number : 3163
Proper shipping name : LIQUEFIED GAS, N.O.S.
(DIFLUOROMETHANE, PENTAFLUOROETHANE, 50/50%)
Class : 2
Classification Code : 2A
Hazard identification No : 20
Label : 2.2

RID

UN Number : 3163
Proper shipping name : LIQUEFIED GAS, N.O.S.
(DIFLUOROMETHANE, PENTAFLUOROETHANE, 50/50%)
Class : 2
Classification Code : 2A
Hazard identification No : 20
Label : 2.2

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IATA Cargo
UN Number : 3163
Proper shipping name : Liquefied gas, n.o.s.
(Difluoromethane, Pentafluoroethane)
Class : 2.2
Label : 2.2

IATA Passenger
UN Number : 3163
Proper shipping name : Liquefied gas, n.o.s.
(Difluoromethane, Pentafluoroethane)
Class : 2.2
Label : 2.2

IMDG
UN Number : 3163
Proper shipping name : LIQUEFIED GAS, N.O.S.
(DIFLUOROMETHANE, PENTAFLUOROETHANE)
Class : 2.2
Label : 2.2
EmS Number : F-C, S-V
Marine Pollutant : no

15. REGULATORY INFORMATION

EEC DIRECTIVE

Safety data sheets : according to Regulation (EC) No. 1907/2006

EC classification / labelling

Dangerous Preparations : D. 1999/45/EC amended by D. 2001/60/CE

Further information : This preparation is not classified as dangerous according to Directive 1999/45/EC.

Special labelling : Contains fluorinated greenhouse gases covered by the Kyoto Protocol:
Difluoromethane
Pentafluoroethane

INVENTORIES

EINECS: Conforms to
TSCA: Conforms to
AICS: Conforms to
DSL: This product contains one or several components listed in the Canadian NDSL list. All other components are on the DSL list.

ENCS (JP): Conforms to
KECI (KR): Conforms to
PICCS (PH): Conforms to
IECSC (CN): Conforms to

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16. OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3

R12 Extremely flammable.

Bibliography : Encyclopédie des gaz (Air Liquide - Ed. 1976 - ELSEVIER AMSTERDAM)

This information applies to the PRODUCT AS SUCH and conforming to specifications of ARKEMA

In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear

The information contained is based on our knowledge of the product, at the date of publishing and it is given quite sincerely.

Users are advised of possible additional hazards when the product is used in applications for which it was not intended. This sheet shall only be used and reproduced for prevention and security purposes.

The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive.

It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product.

It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment.

NB: In this document the numerical separator of the thousands is the "." (point), the decimal separator is "," (comma).

Vertical lines in the left hand margin indicate an amendment from the previous version.