



# Material Safety Data Sheet

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Infosafe No™ LTSJ3 Issue Date :October 2008 ISSUED by ARKEMA CS: 1.4.22

Product Name **FORANE 407C**

## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**Product Name** FORANE 407C  
**Company Name** ARKEMA PTY LTD (ABN 44 000 330 772)  
**Address** Suite 103, 313 Canterbury Rd  
Canterbury  
Victoria 3126 Australia  
**Telephone/Fax Number** Tel: +61 3 9211 5000  
Fax: +61 3 9211 5001  
**Recommended Use** Refrigerant

### Other Information

24 HOUR EMERGENCY RESPONSE:  
AUSTRALIA (toll free): 1800 033 111  
International: + 61 3 9663 2130

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## 2. HAZARDS IDENTIFICATION

**Hazard Classification** DANGEROUS GOODS.  
NON-HAZARDOUS SUBSTANCE.  
Dangerous goods classification according to the Australian Dangerous Goods Code.  
Hazard classification according to the criteria of NOHSC.

**Risk Phrase(s)** R59 Dangerous for the ozone layer.

**Safety Phrase(s)** S61 Avoid release to the environment. Refer to special instructions/safety data sheet.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Name	CAS	Proportion
	Norflurane	811-97-2	30-60 %
	Pentafluoroethane	354-33-6	10-30 %
	Difluoromethane	75-10-5	10-30 %

## 4. FIRST AID MEASURES

**Inhalation** Remove the source of contamination or move the affected person to fresh air. Ensure airways are clear. Apply artificial respiration if not breathing. Seek medical attention.

**Ingestion** Do not induce vomiting. Rinse mouth with copious amounts of water. Seek medical attention.

**Skin** Wash affected area thoroughly with soap and water. Remove contaminated clothing and wash before reuse or discard. Seek medical attention. Where frostbite occurs, treat as thermal burns.

**Eye** If in eyes, hold eyelids apart and flush the eyes continuously with running water. Continue flushing for several minutes until all contaminants are washed off completely. Seek medical attention.

**First Aid Facilities** Eye wash and normal washroom facilities.

**Advice to Doctor** Treat symptomatically.

**Other Information** Do not administer catecholamines, due to the cardiac effect caused by the product.



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## 5. FIRE FIGHTING MEASURES

**Suitable Extinguishing Media** Use fire extinguishing media suitable for the surrounding environment.

**Hazards from Combustion Products** Under fire conditions this product may emit toxic and/or irritating fumes including carbon monoxide, carbon dioxide and hydrogen fluoride.

**Precautions in connection with Fire** Fire-fighters should wear full protective clothing and self contained breathing apparatus (SCBA) operated in positive pressure mode. Water spray may be used to keep fire exposed containers cool.

## 6. ACCIDENTAL RELEASE MEASURES

**Emergency Procedures** Extinguish or remove all sources of ignition. Wear appropriate personal protective equipment and clothing to prevent exposure. Evacuate all unprotected personnel. If safe, damaged cans should be placed in a container outdoors, away from ignition sources, until pressure has dissipated. Undamaged cans should be gathered and stowed safely. Place inert, non-combustible absorbent material onto spillage. Collect spilled material with clean non-sparking tools and seal in labelled drums for disposal. If contamination of sewers or waterways occurs inform the local water authorities and EPA in accordance with local regulations. Dispose of waste according to applicable local and national regulations.

## 7. HANDLING AND STORAGE

**Precautions for Safe Handling** Prevent concentration in hollows and sumps. Do not enter areas where product vapours or mists may exist without respiratory protection or until the atmosphere has been checked. Build up of mists or vapours in the atmosphere must be prevented. Avoid inhalation of vapour and mists. Do not use near welding or other ignition sources and avoid sparks. Do not smoke. Do not puncture cans. Do not incinerate empty cans. When dealing with large quantities, repeated or prolonged exposure without protection should be prevented. Practice good personal hygiene, that is, always wash hands after handling, and before eating, drinking, smoking or using the toilet facilities.

**Conditions for Safe Storage** Store in a cool, dry, well-ventilated area away from sources of ignition, incompatible materials, foodstuffs, clothing and out of direct sunlight. Keep cans closed when not in use and securely sealed and protected against physical damage. Inspect regularly for deficiencies such as damage or leaks. Have appropriate fire extinguishers available in and near the storage area. Do not store in containers of material comprised of alloys containing more than 2% magnesium and plastic material.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**National Exposure Standards** No value is assigned for this specific material by the National Occupational Health and Safety Commission (NOHSC) Australia, however the available exposure limits on the ingredients as provided by NOHSC are as follows:

Substance	TWA		STEL	
	ppm	mg/m <sup>3</sup>	ppm	mg/m
Norflurane	1000	4240	-	-

TWA (Time Weighted Average): The average airborne concentration of a particular substance when calculated over a normal eight-hour working day, for a five-day week.

STEL (Short Term Exposure Limit): The average airborne concentration over a 15 minute period which should not be exceeded at any time during a normal eight-hour workday.

**Biological Limit Values** No biological limit available.

**Engineering Controls** Provide sufficient ventilation to keep airborne levels below the exposure limit. Where vapours or mists are generated, particularly in enclosed areas, and natural ventilation is inadequate, a flameproof exhaust ventilation system is required.

**Respiratory Protection** If engineering controls are not effective in controlling airborne exposure then respiratory protective equipment should be used. Reference should be made

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<b>Eye Protection</b>	to Australian Standards AS/NZS 1715, Selection, Use and maintenance of Respiratory Protective Devices; and AS/NZS 1716, Respiratory Protective Devices.
<b>Hand Protection</b>	Safety glasses with side shields, goggles or full-face shield as appropriate recommended. Eye protection should conform with Australian/New Zealand Standard AS/NZS 1337 - Eye Protectors for Industrial Applications.
<b>Body Protection</b>	Wear gloves of impervious material. Reference should be made to AS/NZS 2161.1: Occupational protective gloves - Selection, use and maintenance.
	Wear appropriate clothing including chemical resistant apron where clothing is likely to be contaminated. It is advisable that a local supplier of personal protective clothing is consulted regarding the choice of material.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	Colourless liquefied gas
<b>Odour</b>	Slightly Ether-like
<b>Melting Point</b>	Not available
<b>Boiling Point</b>	-42.4 °C
<b>Solubility in Water</b>	Insoluble
<b>pH Value</b>	Not applicable
<b>Vapour Pressure</b>	1.13 MPa (25°C) 2.11 MPa (50°C) 3.26 MPa (70°C)
<b>Vapour Density (Air=1)</b>	4.54 kg/m <sup>3</sup> (At the boiling point)
<b>Octanol/Water Partition Coefficient</b>	log Pow = 0.21 (Difluoromethane) log Pow = 1.48 (Pentafluoromethane) log Pow = 1.06 (Norflurane)
<b>Density</b>	1133 kg/m <sup>3</sup> (25°C) 1004 kg/m <sup>3</sup> (50°C) 861 kg/m <sup>3</sup> (70°C)
<b>Flash Point</b>	Not applicable
<b>Flammability</b>	Non-flammable
<b>Auto-Ignition Temperature</b>	Not available
<b>Flammable Limits - Lower</b>	Not applicable
<b>Flammable Limits - Upper</b>	Not applicable
<b>Other Information</b>	Henry's constant : Difluoromethane: 296,00E+02 Pa m <sup>3</sup> /mol Pentafluoroethane: 309,000E+03 Pa m <sup>3</sup> /mol Norflurane: 506,0E+01 kPa m <sup>3</sup> /mol Critical temperature: Tc=89°C Critical pressure: Pc=4.64 MPa

## 10. STABILITY AND REACTIVITY

<b>Chemical Stability</b>	The product is stable under normal handling and storage conditions
<b>Conditions to Avoid</b>	Avoid contact with flames and red hot metallic surfaces
<b>Hazardous Decomposition Products</b>	Thermal decomposition may result in the release of toxic and/or irritating fumes including carbon monoxide, carbon dioxide, fluorine and hydrogen fluoride (hydrofluoric acid).
<b>Hazardous Polymerization</b>	Will not occur.

## 11. TOXICOLOGICAL INFORMATION

<b>Toxicology Information</b>	No toxicology data available for this product.
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<b>Inhalation</b>	May cause irritation to the mucous membrane and upper airways. Symptoms may include sneezing, coughing, wheezing, shortness of breath, headache, dizziness, nausea and vomiting. Inhalation of large quantities may cause loss of consciousness and cardiac disorders aggravated by stress and lack of oxygen.
<b>Ingestion</b>	Ingestion of this product may irritate the gastric tract causing possible nausea and vomiting.
<b>Skin</b>	May cause irritation resulting in redness and itching. Ejection of liquefied gas may result in possible frostbite.
<b>Eye</b>	On eye contact this product may cause tearing, stinging, blurred vision, and redness.
<b>Chronic Effects</b>	Not available

## 12. ECOLOGICAL INFORMATION

<b>Ecotoxicity</b>	No data available for this product, however, toxicity data for Norflurane is as follows: LC50(Rainbow trout) 450mg/L EC50(Daphnia) 980mg/L 48H EC10(Pseudomonas putida) >730mg/L
<b>Persistence / Degradability</b>	<b>IN WATER:</b> Difluoromethane: Not readily biodegradable 5% after 28days Pentafluoroethane: Not readily biodegradable 5% after 28days Norflurane: Not readily biodegradable 3% after 28days <b>IN AIR:</b> Pentafluoroethane: Degradation in the troposphere Overall half life time: 28.3yrs (estimation) Norflurane: Direct photolysis Overall half life time: 8.6-16.7 yrs Pentafluoroethane: Global warming potential Value: 0.58 Norflurane: Global warming potential Value: 0.26 Pentafluoroethane: Ozone depletion potential: ODP (R11=1) Value=0 Norflurane: Ozone depletion potential: ODP (R11=1) Value=0
<b>Mobility</b>	Difluoromethane: In soils and sediments: Very slight adsorption. Pentafluoroethane: In aqueous environment: Volatilization 1/2 life time 3.2 h (estimation) In soils and sediments: Very slight adsorption. Log Koc 1.3-1.7 Norflurane: In soils and sediments: Slight adsorption. Log Koc 1.5 (Calculated)
<b>Bioaccumulative Potential</b>	Difluoromethane: Practically not biodegradable log Kow: 0.21 Pentafluoroethane: Practically not biodegradable log Kow: 1.48 Norflurane: Practically not biodegradable log Kow: 1.06
<b>Environ. Protection</b>	Prevent substance from entering the environment.

## 13. DISPOSAL CONSIDERATIONS



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<b>Disposal Considerations</b>	The disposal of the spilled or waste material must be done in accordance with applicable local and national regulations.
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## 14. TRANSPORT INFORMATION

<b>Transport Information</b>	This material is classified as a Class 2.2 (Non-flammable Non-toxic Gas) Dangerous Good according to the Australian Code for the Transport of Dangerous Goods by Road and Rail. Dangerous goods of Class 2.2 (Non-flammable Non-toxic Gas) are incompatible in a placard load with any of the following: <ul style="list-style-type: none"><li>- Class 1, Explosive</li><li>- Class 4.2, Spontaneously Combustible Substance</li><li>- Class 5.2, Organic Peroxide</li></ul>
<b>U.N. Number</b>	3340
<b>Proper Shipping Name</b>	REFRIGERANT GAS R 407 C
<b>DG Class</b>	2.2
<b>IERG Number</b>	06

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## 15. REGULATORY INFORMATION

<b>Regulatory Information</b>	Not classified as Hazardous according to criteria of National Occupational Health & Safety Commission (NOHSC), Australia. Not classified as a Scheduled Poison according to the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).
<b>Poisons Schedule</b>	Not Scheduled

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## 16. OTHER INFORMATION

<b>Date of preparation or last revision of MSDS</b>	Date reviewed: October 2008 Supersedes: September 2003
<b>Contact Person/Point</b>	MELBOURNE: SUITE 103, 313 CANTERBURY ROAD, CANTERBURY. BUS HRS TEL: (03) 9211 5000 (03) 9211 5001
<b>Literature References</b>	SDS: 001965-001 Version 1.0  ...End Of MSDS...

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