

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006



BRITON® R407C

Version: CLP01

Date: July 2012

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1. Identification of the substance / preparation and company / undertaking

Product name	R407C	
REACH registration numbers	1,1,1,2-Tetrafluoroethane Pentafluoroethane Difluoromethane	01-2119459374-33 01-2119485636-25 Deadline not yet expired
Company	Rhodia Chemicals Ltd. 19 St. Christophers Way, Patriot Way Business Park, Pride Park, DERBY. DE24 8JY UNITED KINGDOM	
Emergency phone number	+44 1332 762547 (24 hour)	
Use	Refrigerant	

2. Hazards identification

EC Classification

EC Directive 67/548/EEC or 1999/45/EC	Not classified as hazardous
Regulation (EC) No. 1272/2008 (CLP)	Gases under pressure – Liquefied gas

Label Elements

Name on label	
Hazardous components	1,1,1,2-Tetrafluoroethane (R134a) Pentafluoroethane (R125) Difluoromethane (R32)
Hazard statement(s)	H280: Contains gas under pressure; may explode if heated
Signal word(s)	Warning
Hazard pictogram(s)	
Precautionary statement(s)	
Storage	P410 + P403: Protect from sunlight. Store in a well-ventilated place.

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3. Composition / information on ingredients

Concentration

Substance name	CAS No.	EC No.	Concentration
1,1,1,2-Tetrafluoroethane (R134a)	811-97-2	212-377-0	ca. 52%
Pentafluoroethane (R125)	354-33-6	206-557-8	ca. 25%
Difluoromethane (R32)	75-10-5	200-839-4	ca. 23%

Hazardous components according to Regulation (EC) 1272/2008 as amended

Substance name	Hazard class	Hazard category	H Phrases
1,1,1,2-Tetrafluoroethane (R134a)	Gases under pressure	Liquefied gas	H280
Pentafluoroethane (R125)	Gases under pressure	Liquefied gas	H280
Difluoromethane (R32)	Flammable gases	Category 1	H220
	Gases under pressure	Liquefied gas	H280

Hazardous components according to European Directive 67/548/EEC or 1999/45/EC as amended

Substance name	Classification	Hazard category	R-phrase(s)
Difluoromethane (R32)	F+	Extremely flammable	R12

4. First aid measures

Inhalation Remove to fresh air. Oxygen or artificial respiration if needed. If symptoms persist, call a physician.

Skin contact Allow to evaporate. Wash off with warm water. If symptoms persist, call a physician.

Eye contact Immediately irrigate with eyewash solution or clean water, holding the eyelids apart for at least 10 minutes. Obtain immediate medical attention.

Ingestion Unlikely route of exposure.

Most important symptoms/effects, acute and delayed

Inhalation In case of higher concentrations: narcosis, asphyxia, may cause cardiac arrhythmia.

Skin contact Contact with liquid or refrigerated gas can cause cold burns and frostbite. Prolonged skin contact may defat the skin and produce dermatitis.

Eye contact Causes frostbite burns to eyes. Symptoms: Lachrymation, redness, swelling of tissue, frostbite, burn.

Ingestion Gas. Not applicable.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.

Unsuitable extinguishing media None.

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Specific hazards arising from the Chemical

The product is not flammable.
Hazardous decomposition products formed under fire conditions.

Special protective actions for Fire-Fighters

Wear self-contained breathing apparatus and protective suit
Wear chemical resistant oversuit
Special protective actions for fire-fighters
In case of fire, use water spray
Keep product and empty container away from heat and sources of ignition

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel

Prevent further leakage or spillage if safe to do so
Keep away from incompatible products

Advice for emergency responders

Immediately evacuate personnel to safe areas
Keep people away from and upwind of spill/leak
Wear self-contained breathing apparatus and protective suit
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing
Suppress (knock down) gases/vapours/mists with a water spray jet
Avoid spraying the leak source
Ventilate area

Environmental precautions

Discharge into the environment must be avoided
Inform the responsible authorities in case of gas leakage or of entry into waterways, soil or drains

Methods and materials for containment and cleaning up

Allow to evaporate
Prevent product from entering drains

Reference to other sections

Refer to protective measures listed in sections 7 and 8.

7. Handling and storage

Precautions for safe handling

Use only in well-ventilated areas
Use only clean and dry utensils
Keep away from water
Preferably transfer by pump or gravity
Keep away from incompatible products

Conditions for storage, including incompatibilities

Storage

Keep only in the original container
Store in a receptacle equipped with a vent
Keep containers tightly closed in a cool, well-ventilated place
Keep in properly labelled containers
Keep in a banded area
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Keep away from incompatible products

Packing material

Suitable material – steel cylinder

Specific use(s)

For further information, please contact supplier.

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8. Exposure controls / personal protection

Control parameters

Exposure limit values

Substance	Briton acceptable exposure limit	EH40 workplace exposure limits
1,1,1,2-Tetrafluoroethane	TWA = 1000 ppm	TWA = 1000 ppm / 4240 mg/m ³
Pentafluoroethane	TWA = 1000 ppm	Not listed
Difluoromethane	TWA = 1000 ppm	Not listed

Exposure controls

Appropriate engineering controls

Ensure adequate ventilation
Apply technical measures to comply with the occupational exposure limits

Respiratory protection

Self-contained breathing apparatus (EN 133)
Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions
Use only respiratory protection that conforms to international / national standards

Hand protection

Take note of the information given by the producer concerning permeability and break through times and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves
Suitable material: Fluoroelastomer

Eye protection

Tightly fitted safety goggles

Skin and body protection

Wear suitable protective clothing
If splashes are likely to occur, wear: apron, boots, Neoprene

Hygiene measures

Eye wash bottles or eye wash stations in compliance with applicable standards
When using do not eat, drink or smoke
Gloves, overalls and boots have to be double layered (protection against cold temperature).
Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls

Dispose of rinse water in accordance with local and national regulations.

9. Physical and chemical properties

Form	Compressed liquefied gas
Colour	Colourless
Odour	Ether-like
pH	Neutral
pKa	Not applicable
Melting point/freezing point	-103°C (Pentafluoroethane)
Boiling point/boiling range	-44 to -37°C
Flash point	Not applicable
Evaporation rate	No data
Flammability (solid, gas)	The product is not flammable
Flammability	Not applicable

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Explosive properties	Not explosive
Vapour pressure	10.35 bar at 20°C 21.94 bar at 50°C (Pentafluoroethane)
Vapour density	3.45
Density	Not applicable
Relative density	1.17 at 20°C
Bulk density	Not applicable
Solubility	430 mg/l at 25°C, water (Pentafluoroethane)
Solubility/qualitative	No data available
Partition coefficient: n-octanol/water	log Pow: 1.48, 20°C (pentafluoroethane)
Auto-ignition temperature	No data available
Decomposition temperature	No data
Viscosity	Not applicable
Oxidizing properties	Non oxidizer

10. Stability and reactivity

Reactivity	Risk of violent reaction
Chemical stability	Stable under recommended storage conditions
Possibility of hazardous reactions	Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.
Conditions to avoid	Heat
Materials to avoid	Light and/or alkaline metals, powdered metals, alkaline earth metals, oxidising agents
Hazardous decomposition products	Gaseous hydrogen fluoride (HF), Fluorophosgene The release of other hazardous decomposition products is possible

11. Toxicological information

Acute toxicity	
Acute oral toxicity	Not applicable
Acute inhalation toxicity	LC50, 4 h, >2,080,000 mg/m ³ (1,1,1,2-Tetrafluoroethane)
Acute dermal toxicity	Not applicable
Skin corrosion/irritation	Not applicable
Serious eye damage/eye irritation	Not applicable
Respiratory or skin sensitization	Guinea pig, did not cause sensitization on laboratory animals
Mutagenicity	In vitro tests did not show mutagenic effects (Pentafluoroethane) In vivo tests did not show mutagenic effects (Pentafluoroethane)
Carcinogenicity	Negative (1,1,1,2-Tetrafluoroethane)
Toxicity for reproduction	Developmental toxicity, rat, no observed effect (1,1,1,2-Tetrafluoroethane)
Repeated dose toxicity	Inhalation, after a single exposure, dog, cardiac sensitization following adrenergic stimulation Inhalation, rat, >=50000ppm, NOAEL (1,1,1,2-Tetrafluoroethane) Inhalation, repeated exposure, rat, >=50000ppm, NOAEL (Pentafluoroethane) Inhalation, 90-day, rat, 108 mg/m ³ , NOAEL (Difluoromethane)
Other information	No data available

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12. Ecological information

Toxicity

Fishes	Brachydanio rerio	LC50	96 h	>200 mg/l	1,1,1,3,3-pentafluorobutane
Fishes	Brachydanio rerio	LC50	96 h	Ca. 200 mg/l	1,1,1,3,3-pentafluorobutane
Crustaceans	Daphnia magna	EC50	48 h	>200 mg/l	1,1,1,3,3-pentafluorobutane
Crustaceans	Daphnia magna	NOEC	48 h	200 mg/l	1,1,1,3,3-pentafluorobutane
Algae	Selenastrum capricornutum	NOEC	72 h	13.2 mg/l	1,1,1,3,3-pentafluorobutane
Algae	Selenastrum capricornutum	EC50	72 h	>114 mg/l	1,1,1,3,3-pentafluorobutane
Terrestrial plants		NOEC	growth	$\geq 6 \text{ g/m}^3$	

Persistence and degradability

Abiotic degradation

Air, indirect photo-oxidation. $T_{1/2}$ from 4.16 – 28.2 y

Conditions: sensitizer: OH radicals.

Degradation products: carbon dioxide (CO₂) / hydrofluoric acid / TFA

Biodegradation

Aerobic, tested according to closed bottle test, chemical degradation, 2-5% after 28 d. Result: not readily biodegradable

Aerobic, tested according to biodegradation by methane oxidation. Result: not readily biodegradable (1,1,1,2-Tetrafluoroethane)

Bioaccumulative potential

Bioaccumulative potential: log Pow 0.21-1.48. Result: does not bioaccumulate

Mobility

Soil/sediments, adsorption, log KOC: from 1.05 – 1.7. Conditions: calculated value

Air, Henry's law constant (H), from 19.7 – 150 hPa.m³/mol, 20°C.

Conditions: calculated value, considerable volatility

Other adverse effects

Ozone depletion potential = 0

Result = no effect on stratospheric ozone

Ozone depletion potential; ODP; (R11 = 1)

Global Warming Potential = 0.25

Halocarbon global warming potential; HGWP; (R11 = 1) (1,1,1,2-Tetrafluoroethane)

13. Disposal considerations

Waste disposal methods

In accordance with local and national regulations

Refer to manufacturer/supplier for information on recovery/recycling

Contaminated packaging

To avoid treatments, as far as possible, use dedicated containers

Where possible recycling is preferred to disposal or incineration

14. Transport information

International transport regulations

IATA-DGR

UN number

UN 3340

Class

2.2

ICAO-Labels

2.2 - Non-flammable, non-toxic gas

Proper shipping name

REFRIGERANT GAS R407C

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IMDG

UN number UN 3340
Class 2.2
IMDG-Labels 2.2 - Non-flammable, non-toxic gas
HI/UN No. 3340
EmS F-C, S-V
Proper shipping name REFRIGERANT GAS R407C

ADR

UN number UN 3340
Class 2
ADR/RID Labels 2.2 - Non-flammable, non-toxic gas
HI/UN No. 20 / 3340
Proper shipping name REFRIGERANT GAS R407C

RID

UN number UN 3340
Class 2
ADR/RID Labels 2.2 - Non-flammable, non-toxic gas
HI/UN No. 20 / 3340
Proper shipping name REFRIGERANT GAS R407C

ADN

UN number UN 3340
Class 2
ADR/RID Labels 2.2 – Non-flammable, non-toxic gas
Proper shipping name REFRIGERANT GAS R407C

15. Regulatory information

Applicable Laws or Regulations

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as amended
- Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations, as amended
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, as amended
- Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste
- EH40/2005 Workplace Exposure Limits, as amended through 1, 10, 2007 (WEL's) published by the Health and Safety Executive (HSE). Issued under the Control of Substances Hazardous to Health Regulations, as amended

Notification status

Inventory information	Status
Australian Inventory of Chemical Substances (AICS)	In compliance with inventory
Canadian Domestic Substances List (DSL)	In compliance with inventory
Inventory of Existing Chemical Substances (China) (IECS)	In compliance with inventory
Japanese Existing and New Chemical Substances (MITI List) (ENCS)	In compliance with inventory
New Zealand Inventory of Chemicals (NZIOC)	In compliance with inventory
Toxic Substance Control Act List (TSCA)	In compliance with inventory
EU List of Existing Chemical Substances (EINECS)	In compliance with inventory
Korean Existing Chemicals Inventory (KECI (KR))	In compliance with inventory
Philippine Inventory of Chemicals and Chemical Substances (PICCS)	In compliance with inventory

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16. Other information

Full text of H-Statements referred to under section 3

H220

Extremely flammable gas

H280

Contains gas under pressure; may explode if heated

This datasheet was prepared in accordance with Regulation (EC) No. 1907/2006.

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