SAFETY DATA SHEET

TRIFLUOROMETHYL TRIFLUOROVINYL ETHER

Compilation date: 12/01/2006

Revision date: 22/09/2014

Revision No: 3

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: TRIFLUOROMETHYL TRIFLUOROVINYL ETHER

CAS number: 1187-93-5

EINECS number: 214-703-7

Product code: PC7778E

Synonyms: TRIFLUORO(TRIFLUOROMETHOXY)ETHYLENE

PERFLUORO(METHYL VINYL ETHER)

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.3. Details of the supplier of the safety data sheet

Company name: Apollo Scientific Ltd

Units 3 & 4

Parkway

Denton

Manchester

M34 3SG

UK

Tel: 0161 337 9971

Fax: 0161 336 6932

Email: david.tideswell@apolloscientific.co.uk

1.4. Emergency telephone number

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CHIP: F+: R12; Xn: R20; -: R44

Classification under CLP: Flam. Gas 1: H220; Press. Gas: H280; Acute Tox. 4: H332; -: EUH044

Most important adverse effects: Extremely flammable. Harmful by inhalation. Risk of explosion if heated under confinement.

2.2. Label elements

Label elements under CLP:

Hazard statements: H220: Extremely flammable gas.

H280: Contains gas under pressure; may explode if heated.

H332: Harmful if inhaled.

EUH044: Risk of explosion if heated under confinement.

[cont...]

Signal words: Danger

Hazard pictograms: GHS02: Flame

GHS04: Gas cylinder

GHS07: Exclamation mark

Precautionary statements: P251: Pressurized container: Do not pierce or burn, even after use.

P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P260: Do not breathe gas.

Label elements under CHIP:

Hazard symbols: Extremely flammable.

Harmful.

Risk phrases: R12: Extremely flammable.

R20: Harmful by inhalation.

R44: Risk of explosion if heated under confinement.

Safety phrases: S16: Keep away from sources of ignition - No smoking.

S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S36/37/39: Wear suitable protective clothing, gloves and eye / face protection.

2.3. Other hazards

Other hazards: In use, may form flammable / explosive vapour-air mixture. Risk of explosion if heated under confinement.

PBT: This substance is not identified as a PBT substance.

Section 3: Composition/information on ingredients

3.1. Substances

Chemical identity: TRIFLUOROMETHYL TRIFLUOROVINYL ETHER

CAS number: 1187-93-5

EINECS number: 214-703-7

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Wash immediately with plenty of soap and water. Consult a doctor.

Eye contact: Bathe the eye with running water for 15 minutes. Consult a doctor.

Ingestion: Unlikely route of exposure. Wash out mouth with water. Consult a doctor.

Inhalation: Remove casualty from exposure ensuring one's own safety whilst doing so. Move to fresh air in case of accidental inhalation of vapours. Consult a doctor.

[cont...]

4.2. Most important symptoms and effects, both acute and delayed

Skin contact: There may be irritation and redness at the site of contact. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be irritation and redness. The eyes may water profusely.

Ingestion: It is unlikely that this substance will be swallowed due to its physical properties.

Inhalation: May be harmful if inhaled. There may be irritation of the throat with a feeling of tightness in the chest.

4.3. Indication of any immediate medical attention and special treatment needed

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Carbon dioxide, dry chemical powder, foam. Suitable extinguishing media for the surrounding fire should be used.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: Highly flammable. Forms explosive air-vapour mixture. Vapour may travel considerable distance to source of ignition and flash back. In combustion emits toxic fumes of carbon dioxide / carbon monoxide. Hydrogen fluoride (HF).

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes. Cylinder may explode under conditions of fire.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Refer to section 8 of SDS for personal protection details. If outside do not approach from downwind. If outside keep bystanders upwind and away from danger point. Mark out the contaminated area with signs and prevent access to unauthorised personnel. Eliminate all sources of ignition.

6.2. Environmental precautions

Environmental precautions: Do not discharge into drains or rivers. Alert the neighbourhood to the presence of fumes or gas.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Ventilate area.

6.4. Reference to other sections

Section 7: Handling and storage

[cont...]

7.1. Precautions for safe handling

Handling requirements: Avoid direct contact with the substance. Ensure there is sufficient ventilation of the area. Do not handle in a confined space. Smoking is forbidden. Use non-sparking tools. Pressurised container: protect from sunlight and do not expose to temperatures exceding 50°C. Do not pierce or burn, even after use. Fire or intense heat may cause violent rupture.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Keep away from sources of ignition. Prevent the build up of electrostatic charge in the immediate area. Ensure lighting and electrical equipment are not a source of ignition. Store in tightly closed, airtight, moisture-proof cylinders in a cool, dry, well-ventilated area away from heat, sources of ignition and sparks. Protect the pressurised containers from physical damage.

Suitable packaging: Must only be kept in original packaging.

7.3. Specific end use(s)

Specific end use(s): No data available.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Workplace exposure limits: No data available.

DNEL / PNEC No data available.

8.2. Exposure controls

Engineering measures: Ensure there is sufficient ventilation of the area. Ensure lighting and electrical equipment are not a source of ignition.

Respiratory protection: Self-contained breathing apparatus must be available in case of emergency.

Hand protection: Impermeable gloves.

Eye protection: Safety glasses. Ensure eye bath is to hand.

Skin protection: Impermeable protective clothing.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquified gas

Colour: Colourless

Boiling point/range°C: -23

upper: 50

Vapour pressure: 70.3 psia @ 20°C

Flammability limits %: lower: 7.5

Autoflammability°C: 135

[cont...]

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.

10.4. Conditions to avoid

Conditions to avoid: Heat. Hot surfaces. Sources of ignition. Flames.

10.5. Incompatible materials

Materials to avoid: Strong oxidising agents. Alkali metals.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of carbon dioxide / carbon monoxide. Hydrogen fluoride (HF).

Section 11: Toxicological information

11.1. Information on toxicological effects

Relevant hazards for substance:

Hazard	Route	Basis
Acute toxicity (ac. tox. 4)	INH	Based on test data

Symptoms / routes of exposure

Skin contact: There may be irritation and redness at the site of contact. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be irritation and redness. The eyes may water profusely.

Ingestion: It is unlikely that this substance will be swallowed due to its physical properties.

Inhalation: May be harmful if inhaled. There may be irritation of the throat with a feeling of tightness in the chest.

Section 12: Ecological information

12.1. Toxicity

Ecotoxicity values: No data available.

[cont...]

12.2. Persistence and degradability

Persistence and degradability: No data available.

12.3. Bioaccumulative potential

Bioaccumulative potential: No data available.

12.4. Mobility in soil

Mobility: No data available.

12.5. Results of PBT and vPvB assessment

PBT identification: This substance is not identified as a PBT substance.

12.6. Other adverse effects

Other adverse effects: No data available.

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: MATERIAL SHOULD BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS

Disposal of packaging: Dispose of as special waste in compliance with local and national regulations Observe all federal, state and local environmental regulations.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

14.1. UN number

UN number: UN3153

14.2. UN proper shipping name

Shipping name: PERFLUORO(METHYL VINYL ETHER)

14.3. Transport hazard class(es)

Transport class: 2

14.4. Packing group

14.5. Environmental hazards

Environmentally hazardous: No **Marine pollutant:** No

14.6. Special precautions for user

Tunnel code: B/D

Transport category: 2

Section 15: Regulatory information

[cont...]

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 453/2010.

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* Data predicted using computational software. Toxtree - Toxic Hazard Estimation by decision tree approach. http://ecb.jrc.ec.europa.eu/qsar/qsar-tools/index.php?c=TOXTREE

~ Data predicted using computatioanl software ACD/ToxSuite v 2.95.1 Copyright 1994-2009 ACD/labs, Copyright 2001-2009 Pharma Algorithms, Inc, Advanced Chemistry Development, Inc (ACD/Labs). http://www.acdlabs.com/products/pc_admet/tox/tox/

Phrases used in s.2 and 3: EUH044: Risk of explosion if heated under confinement.

H220: Extremely flammable gas.

H280: Contains gas under pressure; may explode if heated.

H332: Harmful if inhaled.

R12: Extremely flammable.

R20: Harmful by inhalation.

R44: Risk of explosion if heated under confinement.

Legal disclaimer: The material is intended for research purposes only and should be handled exclusively by those who have been fully trained in safety, laboratory and chemical handling procedures. The above information is believed to be correct to the best of our knowledge. The above information is believed to be correct to the best of our knowledge at the date of its publication, but should not be considered to be all inclusive. It should be used only as a guide for safe handling, storage, transportation and disposal. We cannot guarantee that the hazards detailed in this document are the only hazards that exist for this product. This is not a warranty and Apollo Scientific Ltd shall not be held liable for any damage resulting from handling or from contact with the above product.