

**Danger**

### SECTION 1: Identification of the hazardous chemical and of the supplier

#### 1.1. Product identifier

Trade name : Fluoromethane (R41)  
Name : Fluoromethane (R41)  
Chemical name : Fluoromethane  
CAS-No. : 593-53-3  
Formula : CH<sub>3</sub>F  
IUPAC name : Fluoromethane

#### 1.2. Other means of identification

Product code : ALM/SDS/8

#### 1.3. Recommended use of the chemical and restrictions on use

Recommended use : Test gas/Calibration gas.  
Chemical reaction / Synthesis.  
Use as refrigerant.  
Laboratory use.  
Industrial and professional uses. Perform risk assessment prior to use.  
Contact supplier for more information on uses.

Restrictions on use : Consumer use.

#### 1.4. Supplier details

AIR LIQUIDE MALAYSIA SDN. BHD.  
Lot PT 2317, No. 21, Jalan PTB 1  
Kawasan Perindustrian Tangga Batu, Mukim Sungai Udang,  
76400 Melaka  
Malaysia

#### 1.5. Emergency phone number

Emergency number : +606-3513512

### SECTION 2: Hazards identification

#### 2.1. Classification of the hazardous chemical

Classification according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Flammable gases, Category 1 H220  
Gases under pressure : Liquefied gas H280

#### 2.2. Label elements

Labelling according to Industry Code of Practice on chemicals classification and hazard communication (2019)

Hazard pictograms (GHS MY) :



Signal word (GHS MY) : Danger  
Hazard statements (GHS MY) : H220 - Extremely flammable gas  
H280 - Contains gas under pressure; may explode if heated

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Precautionary statements (GHS MY) : P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
P381 - Eliminate all ignition sources if safe to do so  
P403 - Store in a well-ventilated place  
P410+P403 - Protect from sunlight. Store in a well-ventilated place

### 2.3. Other hazards that do not result in classification

Other hazards which do not result in classification : Contact with liquid may cause cold burns/frostbite,Asphyxiant in high concentrations,These high concentrations are within the flammability range,The substance/mixture has no endocrine disrupting properties.

## SECTION 3: Composition and information of the ingredients of the hazardous chemical

### 3.1. Substances

Substance type : Mono-constituent  
IUPAC name : Fluoromethane  
Chemical name : Fluoromethane

Name	Product identifier	%
Fluoromethane (R41) (Main constituent)	CAS-No.: 593-53-3	100

Full text of H-statements: see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of necessary first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.  
First-aid measures after skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.  
First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.  
First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms/effects, acute and delayed

Most important symptoms and effects, both acute and delayed : See section 11. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.

### 4.3. Indication of immediate medical attention and special treatment needed, if necessary

Other medical advice or treatment : None.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable extinguishing media

Suitable extinguishing media : Water spray or fog. Dry powder. Shutting off the source of the gas is the preferred method of control.  
Unsuitable extinguishing media : Carbon dioxide. Do not use water jet to extinguish.

### 5.2. Physicochemical hazards arising from the chemical

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.  
Hazardous combustion products : Carbonyl fluoride. Carbon monoxide. Hydrogen fluoride.

### 5.3. Special protective equipment and precautions for fire fighters

Hazchem Code : 2YE

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Special protective equipment for fire fighters	: In confined space use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Specific methods	: Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire, Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems, If possible, stop flow of product, Use water spray or fog to knock down fire fumes if possible, Move containers away from the fire area if this can be done without risk.
EAC code	: 2YE

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment, and emergency procedures

General measures	: Try to stop release. Evacuate area. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Eliminate ignition sources. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Act in accordance with local emergency plan. Stay upwind.
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##### **6.1.1. For non-emergency personnel**

Emergency procedures	: Act in accordance with local emergency plan. Try to stop release. Evacuate area. Eliminate ignition sources. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Stay upwind. See section 8 of the SDS for more information on personal protective equipment.
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##### **6.1.2. For emergency responders**

Emergency procedures	: Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. See section 5.3 of the SDS for more information.
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#### 6.2. Environmental precautions

Try to stop release.

#### 6.3. Methods and materials for containment and cleaning up

Methods and material for containment and cleaning up	: Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost).
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### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Safe handling of the gas receptacle	: Refer to supplier's container handling instructions. Do not allow backfeed into the container. Protect containers from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating valve discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep container valve outlets clean and free from contaminants particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to transfer gases from one cylinder/container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the content of the container. Suck back of water into the container must be prevented. Open valve slowly to avoid pressure shock.
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### Safe use of the product

: Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment. Purge air from system before introducing gas. Take precautionary measures against static discharge. Keep away from ignition sources (including static discharges). Consider the use of only non-sparking tools. Ensure equipment is adequately earthed. The product must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularly) checked for leaks before use. Do not smoke while handling product. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Avoid suck back of water, acid and alkalis. Do not breathe gas. Avoid release of product into work area.

### 7.2. Conditions for safe storage, including any incompatibilities

#### Conditions for safe storage, including any incompatibilities

: Segregate from oxidant gases and other oxidants in store. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

## SECTION 8: Exposure controls and personal protection

### 8.1. Control parameters

No additional information available

### Exposure limit values for the other components

No additional information available

### 8.1.1 Biological monitoring

No additional information available

### 8.2. Appropriate engineering controls

#### Appropriate engineering controls

: Provide adequate general and local exhaust ventilation. Product to be handled in a closed system. Gas detectors should be used when flammable gases/vapours may be released. Consider the use of a work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages.

### 8.3. Individual protection measures, such as PPE

#### Hand protection:

Wear cold insulating gloves when transfilling or breaking transfer connections. Standard EN 511 - Cold insulating gloves. Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher.

#### Eye protection:

Wear goggles when transfilling or breaking transfer connections. Standard EN 166 - Personal eye-protection - specifications

#### Respiratory protection:

None necessary. Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems. Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

### Personal protective equipment symbol(s):



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Thermal hazard protection	: None in addition to the above sections.
Environmental exposure controls	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

### SECTION 9: Physical and chemical properties

Physical state	: Gas
Appearance	: No data available
Colour	: Colourless.
Odour	: No odour warning properties.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point	: -142 °C
Freezing point	: -142 °C
Boiling point	: -78.4 °C
Flash point	: Not applicable for gases and gas mixtures.
Evaporation rate	: Relative evaporation rate (ether=1): Not applicable for gases and gas mixtures.
Flammability (solid, gas)	: Extremely flammable gas.
Explosive limits	: 5.6 vol %
Vapour pressure	: Vapour pressure: 33 bar(a) Vapour pressure at 50°C: Not applicable.
Relative vapour density at 20°C	: Not applicable.
Relative density	: 0.61 Relative gas density: 1.2
Solubility	: Water: 2295 mg/l
Partition coefficient n-octanol/water (Log Pow)	: 0.51
Partition coefficient n-octanol/water (Log Kow)	: .Not applicable for gas mixtures.
Critical temperature	: 44.5 °C
Auto-ignition temperature	: Not known.
Decomposition temperature	: Not applicable.
Viscosity, kinematic	: No reliable data available.
Viscosity, dynamic	: No reliable data available.
Explosive properties	: Not applicable.
Density	: ≈ 1275 kg/m <sup>3</sup> Type: 'density' Temp.: 50 °C Remarks on result: 'other:'
Critical pressure	: 5880 kPa
Gas group	: Press. Gas (Liq.)
Molecular mass	: 34 g/mol
Oxidising properties	: Not applicable.
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

### SECTION 10: Stability and reactivity

Reactivity	: No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: Can form explosive mixture with air, May react violently with oxidants.
Conditions to avoid	: Keep away from heat/sparks/open flames/hot surfaces. – No smoking, Avoid moisture in installation systems.
Incompatible materials	: Air, Oxidisers, For additional information on compatibility refer to ISO 11114.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

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Skin corrosion or irritation	: Not classified pH: Not applicable for gases and gas mixtures.
Serious eye damage or eye irritation	: Not classified
Respiratory sensitization	: Not classified
Skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (STOT) – single exposure	: Not classified
Specific target organ toxicity (STOT) – repeated exposure	: Not classified
Aspiration hazard	: Not classified

Fluoromethane (R41) (593-53-3)	
Viscosity, kinematic	No reliable data available.
Other information	: The substance/mixture has no endocrine disrupting properties.

## SECTION 12: Ecological information

### 12.1. Ecotoxicity

Ecology - general	: No data available.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified

Fluoromethane (R41) (593-53-3)	
Partition coefficient n-octanol/water (Log Kow)	.Not applicable for gas mixtures.
Partition coefficient n-octanol/water (Log Pow)	0.51

### 12.2. Persistence and degradability

Fluoromethane (R41) (593-53-3)	
Persistence and degradability	No data available.

### 12.3. Bioaccumulative potential

Fluoromethane (R41) (593-53-3)	
Partition coefficient n-octanol/water (Log Pow)	0.51
Partition coefficient n-octanol/water (Log Kow)	.Not applicable for gas mixtures.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). See section 9.

### 12.4. Mobility in soil

Fluoromethane (R41) (593-53-3)	
Mobility in soil	No additional information available
Partition coefficient n-octanol/water (Log Pow)	0.51
Partition coefficient n-octanol/water (Log Kow)	.Not applicable for gas mixtures.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution. Partition into soil is unlikely.

### 12.5. Other adverse effects

Ozone	: Not classified
Fluorinated greenhouse gases	: Yes

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Effect on global warming	:	Contains fluorinated greenhouse gases listed in Annex I of EU 517/2014 as amended,When discharged in large quantities may contribute to the greenhouse effect,For quantities refer to cylinder label.
GWP 20 years	:	330
GWP 100 years	:	92
GWP 500 years	:	30
Radiative efficiency	:	0.02
Effect on the ozone layer	:	None.
Other adverse effects	:	No known effects from this product.

### SECTION 13: Disposal information

#### 13.1. Disposal methods

Waste treatment methods	:	Contact supplier if guidance is required. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Ensure that the emission levels from local regulations or operating permits are not exceeded. Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <a href="http://www.eiga.eu">http://www.eiga.eu</a> for more guidance on suitable disposal methods. Refer to supplier's waste gas recovery programme. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Return unused product in original container to supplier.
Additional information	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

### SECTION 14: Transportation information

#### 14.1. UN number

UN-No.(UN RTDG)	:	2454
UN-No. (IMDG)	:	2454
UN-No. (IATA)	:	2454

#### 14.2. UN proper shipping name

Proper Shipping Name (UN RTDG)	:	METHYL FLUORIDE (REFRIGERANT GAS R 41)
Proper Shipping Name (IMDG)	:	METHYL FLUORIDE (REFRIGERANT GAS R 41)
Proper Shipping Name (IATA)	:	Methyl fluoride

#### 14.3. Transport hazard class(es)

##### UN RTDG

Transport hazard class(es) (UN RTDG)	:	2.1
Danger labels (UN RTDG)	:	2.1



##### IMDG

Transport hazard class(es) (IMDG)	:	2.1
Danger labels (IMDG)	:	2.1



##### IATA

Transport hazard class(es) (IATA)	:	2.1
Danger labels (IATA)	:	2.1

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### 14.4. Packing Group, if applicable

Packing group (UN RTDG) : Not applicable  
Packing group (IMDG) : Not applicable  
Packing group (IATA) : Not applicable

### 14.5. Environmental hazards

Dangerous for the environment : No  
Marine pollutant : No  
Other information : No supplementary information available

### 14.6. Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code)

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment, Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency, Before transporting product containers: - Ensure there is adequate ventilation, - Ensure that containers are firmly secured, - Ensure valve is closed and not leaking, - Ensure valve outlet cap nut or plug (where provided) is correctly fitted, - Ensure valve protection device (where provided) is correctly fitted.

### **UN RTDG**

Limited quantities (UN RTDG) : 0  
Excepted quantities (UN RTDG) : E0  
Packing instruction (UN RTDG) : P200

### **IMDG**

Limited quantities (IMDG) : 0  
Excepted quantities (IMDG) : E0  
Packing instructions (IMDG) : P200  
EmS-No. (Fire) : F-D - FIRE SCHEDULE Delta - FLAMMABLE GASES  
EmS-No. (Spillage) : S-U - SPILLAGE SCHEDULE Uniform - GASES (FLAMMABLE, TOXIC OR CORROSIVE)  
Stowage category (IMDG) : E  
Stowage and handling (IMDG) : SW2  
Properties and observations (IMDG) : Flammable, colourless gas. Heavier than air (1.2).  
MFAG-No : 115

### **IATA**

PCA Excepted quantities (IATA) : E0  
PCA Limited quantities (IATA) : Forbidden  
PCA limited quantity max net quantity (IATA) : Forbidden  
PCA packing instructions (IATA) : Forbidden  
PCA max net quantity (IATA) : Forbidden  
CAO packing instructions (IATA) : 200  
CAO max net quantity (IATA) : 150kg  
Special provisions (IATA) : A1  
ERG code (IATA) : 10L

### 14.7. Special precautions for user

IBC code : Not applicable.

### 14.8. Hazchem or Emergency Action Code

EAC code : 2YE.  
Hazchem Code : 2YE



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### SECTION 15: Regulatory information

#### 15.1. Safety, health, and environmental regulations specific for the hazardous chemical in question

Fluoromethane (R41) (593-53-3)	
EHS Notification and Registration Scheme	
Environmental Quality (Chlorofluorocarbons Prohibition) Order 1993	Not applicable
Environmental Quality (Industrial Effluent) Regulations 2009	
Environmental Quality (Scheduled Wastes) Regulations 2007	
Control of Industrial Major Accident Hazards Regulations 1996	
Prohibition of Use of Substance Order 1999	
Use and Standards of Exposure of Chemical Hazardous to Health Regulations 2000	
Chemical Weapons Convention Act	
Corrosive and Explosive Substances and Offensive Weapons Act	
Dangerous Drugs Act	
Pesticides Act	
Petroleum (Safety Measures) Act	
Poisons Act 1952	
Poisons (Psychotropic Substances) Regulations 1989	

#### 15.2. International agreements

No additional information available

### SECTION 16: Other information

Version : 2.0  
Issue date : 9/2/2015  
Revision date : 20/12/2022  
Supersedes : 28/08/2018

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### Abbreviations and acronyms

- : ATE - Acute Toxicity Estimate
  - CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
  - REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
  - EINECS - European Inventory of Existing Commercial Chemical Substances
  - CAS# - Chemical Abstract Service number
  - PPE - Personal Protection Equipment
  - LC50 - Lethal Concentration to 50 % of a test population
  - RMM - Risk Management Measures
  - PBT - Persistent, Bioaccumulative and Toxic
  - vPvB - Very Persistent and Very Bioaccumulative
  - STOT- SE : Specific Target Organ Toxicity - Single Exposure
  - CSA - Chemical Safety Assessment
  - EN - European Standard
  - UN - United Nations
  - ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
  - IATA - International Air Transport Association
  - IMDG code - International Maritime Dangerous Goods
  - RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
  - WGK - Water Hazard Class
  - STOT - RE : Specific Target Organ Toxicity - Repeated Exposure
  - UFI : Unique Formula Identifier
- Training advice
- : Ensure operators understand the flammability hazard.

Safety Data Sheet (SDS), Malaysia\_AL

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.