1 Identification

Product identifier

Product name: 2,2-Dichloro-1,1-difluoroethyl methyl ether

Stock number: L17285
CAS Number: 76-38-0
EC number: 200-956-0

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

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

- GHS02 Flame
  Flam. Liq. 3, H226 Flammable liquid and vapour.

- GHS08 Health hazard
  Muta. 2, H341 Suspected of causing genetic defects.

- GHS07
  Eye Irrit. 2A, H319 Causes serious eye irritation.

Hazard(s) not otherwise classified: No information known.

Label elements

GHS label elements: The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

GHS02 GHS07 GHS08

Signal word: Warning

Hazard statements

H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.
H341 Suspected of causing genetic defects.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

B2 - Flammable liquid
D2B - Toxic material causing other toxic effects

Classification system

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

Health (acute effects) = 1
Flammability = 3
Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:
76-38-0 2,2-Dichloro-1,1-difluoroethyl methyl ether

(Contd. on page 2)
**Product name:** 2,2-Dichloro-1,1-difluoroethyl methyl ether

**Identification number(s):**
- EC number: 200-956-0

### 4 First-aid measures

#### Description of first aid measures

**After inhalation**
- Supply fresh air. If required, provide artificial respiration. Keep patient warm.
- Seek immediate medical advice.

**After skin contact**
- Immediately wash with water and soap and rinse thoroughly.
- Seek immediate medical advice.

**After eye contact**
- Rinse opened eye for several minutes under running water. Then consult a doctor.

**After swallowing**
- Seek medical treatment.

**Information for doctor**
- Most important symptoms and effects, both acute and delayed: No further relevant information available.
- Indication of any immediate medical attention and special treatment needed: No further relevant information available.

### 5 Fire-fighting measures

#### Extinguishing media

| Suitable extinguishing agents | Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam. |
| Special hazards arising from the substance or mixture | If this product is involved in a fire, the following can be released: Carbon monoxide and carbon dioxide, Hydrogen chloride (HCl), Hydrogen fluoride (HF) |

#### Protective equipment

- Wear self-contained respirator.
- Wear fully protective impervious suit.

### 6 Accidental release measures

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

- Wear protective equipment. Keep unprotected persons away.
- Ensure good ventilation at the workplace.

#### Environmental precautions

- Do not allow material to be released to the environment without proper governmental permits.
- Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- Dispose of contaminated material as waste according to section 13.
- Keep ignition sources away.

#### Reference to other sections

- See Section 7 for information on safe handling.
- See Section 8 for information on personal protection equipment.
- See Section 13 for disposal information.

### 7 Handling and storage

#### Handling

- Keep container tightly sealed.
- Store in cool, dry place in tightly closed containers.
- Ensure good ventilation at the workplace.
- Prevent formation of aerosols.

#### Information about protection against explosions and fires

- Protect against electrostatic charges.
- Fumes can combine with air to form an explosive mixture.
- Keep ignition sources away.

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

- Requirements to be met by storerooms and receptacles: No special requirements.
- Information about storage in one common storage facility: Store away from oxidizing agents.
- Further information about storage conditions:
  - Keep container tightly sealed.
  - Store in cool, dry conditions in well sealed containers.
  - Specific end use(s): No further relevant information available.

### 8 Exposure controls/personal protection

#### Additional information about design of technical systems

- Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

#### Control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>REL (USA) Ceiling limit value: 13.5 mg/m³, 2 ppm</th>
<th>60-min; for exposure to waste anesthetic gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>76-38-0 2,2-Dichloro-1,1-difluoroethyl methyl ether (100.0%)</td>
<td>EL (Canada) Long-term value: 2 ppm</td>
<td>EV (Canada) Long-term value: 13 mg/m³, 2 ppm</td>
</tr>
</tbody>
</table>

#### Additional information

- No data

#### Exposure controls

- Personal protective equipment

#### General protective and hygienic measures

- The usual precautionary measures for handling chemicals should be followed.
- Keep away from foodstuffs, beverages and feed.
- Remove all soiled and contaminated clothing immediately.
- Wash hands before breaks and at the end of work.
- Avoid contact with the eyes.
- Avoid contact with the eyes and skin.
### 9 Physical and chemical properties

#### General Information
- **Appearance:** Liquid
- **Color:** Colorless
- **Odor:** Not determined
- **Odor threshold:** Not determined.
- **pH-value:** Not determined.

#### Change in condition
- **Melting point/Melting range:** -36 °C (-33 °F)
- **Boiling point/Boiling range:** 105 °C (221 °F)
- **Sublimation temperature / start:** Not determined

#### Flash point:
- 37 °C (99 °F)

#### Flammability (solid, gaseous):
- Not determined.

#### Ignition temperature:
- Not determined.

#### Decomposition temperature:
- Not determined.

#### Auto igniting:
- Not determined.

#### Danger of explosion:
- Product is not explosive. However, formation of explosive air/vapor mixtures is possible.

#### Explosions limits:
- **Lower:** Not determined
- **Upper:** Not determined

#### Vapor pressure:
- Not determined

#### Density at 20 °C (68 °F):
- 1.44 g/cm³ (12.017 lbs/gal)

#### Relative density:
- Not determined.

#### Vapor density:
- Not determined.

#### Evaporation rate:
- Not determined.

#### Solubility in / Miscibility with Water:
- Not miscible or difficult to mix

#### Partition coefficient (n-octanol/water):
- Not determined.

#### Viscosity:
- **dynamic:** Not determined.
- **kinematic:** Not determined.

#### Other information
- No further relevant information available.

### 10 Stability and reactivity

#### Reactivity
- No information known.

#### Chemical stability
- Stable under recommended storage conditions.

#### Thermal decomposition / conditions to be avoided
- Decomposition will not occur if used and stored according to specifications.

#### Possibility of hazardous reactions
- No dangerous reactions known

#### Conditions to avoid
- No further relevant information available.

#### Incompatible materials:
- Oxidizing agents

#### Hazardous decomposition products:
- Carbon monoxide and carbon dioxide
- Hydrogen chloride (HCl)
- Hydrogen fluoride

### 11 Toxicological information

#### Information on toxicological effects
- **Acute toxicity:** No effects known.
- **LD/LC₅₀ values that are relevant for classification:** No data
- **Skin irritation or corrosion:** Imitant to skin and mucous membranes.
- **Eye irritation or corrosion:** Causes serious eye irritation.
- **Sensitization:** No sensitizing effects known.
- **Germ cell mutagenicity:** Suspected of causing genetic defects.
- **Carcinogenicity:** No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
- **Reproductive toxicity:** No effects known.
- **Specific target organ system toxicity - repeated exposure:** No effects known.
- **Specific target organ system toxicity - single exposure:** No effects known.
- **Aspiration hazard:** No effects known.

#### Other information (about experimental toxicology):
- Reproductive effects have been observed on tests with laboratory animals.
- Mutagenic effects have been observed on tests with human lymphocytes.
- Mutagenic effects have been observed on tests with laboratory animals.

#### Subacute to chronic toxicity:
- The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
  - Kidney, Ureter, Bladder - renal function tests depressed.
  - Kidney, Ureter, Bladder - other changes in urine composition.
  - Behavioral - general anesthetic.
  - Behavioral - somnolence (general depressed activity).
  - Behavioral - excitement.
  - Behavioral - antipsychotic.
  - Behavioral - food intake (animal).
  - Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases.
  - Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed oxidase.
  - Lungs, Thorax, or Respiration - other changes.
  - Liver - fatty liver degeneration.
  - Liver - changes in liver weight.
  - Liver - other changes.

(Contd. on page 4)
Safety Data Sheet
per OSHA HazCom 2012

Product name: 2,2-Dichloro-1,1-difluoroethyl methyl ether

(Contd. of page 3)

Endocrine - hyperglycemia.
Endocrine - adrenal cortex tumors.
Brain and Coverings - other degenerative changes.
Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive - Specific Developmental Abnormalities - musculoskeletal system.
Reproductive - Specific Developmental Abnormalities - urogenital system.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistance and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.

Additional ecological information:
General notes:
Do not allow material to be released to the environment without proper governmental permits.
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packaging:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number
DOT, IMDG, IATA UN3271

UN proper shipping name
DOT Ethers, n.o.s. (2,2-Dichloro-1,1-difluoroethyl methyl ether)
IMDG, IATA ETHERS, N.O.S. (2,2-Dichloro-1,1-difluoroethyl methyl ether)

Transport hazard class(es)
DOT

Class
Label 3 Flammable liquids.
3

Class
Label 3 (F1) Flammable liquids
3

IMDG, IATA

Class
Label 3 Flammable liquids.
3

Packing group
DOT, IMDG, IATA III

Environmental hazards: Not applicable.

Special precautions for user
Warning: Flammable liquids

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:
DOT
Marine Pollutant (DOT): No

UN "Model Regulation": UN3271, Ethers, n.o.s. (2,2-Dichloro-1,1-difluoroethyl methyl ether), 3, III

15 Regulatory information

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

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS02 GHS07 GHS08

Signal word Warning

Hazard statements
H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.
H341 Suspected of causing genetic defects.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P338 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 5)
National regulations
This product is not listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Use of this product is restricted to research and development only. This product must be used by or directly under the supervision of a technically qualified individual as defined by TSCA. This product must not be used for commercial purposes or in formulations for commercial purposes.

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 55 - Developmental toxicity Substance is not listed.

Prop 55 - Developmental toxicity, female Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxiloggy Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

USA