1,1,1-Trifluoroethane
Safety Data Sheet 1100307
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Date of issue: 06/20/2016 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form : Substance
Substance name : 1,1,1-Trifluoroethane
CAS No : 420-46-2
Product code : 11003-07
Formula : C2H3F3
Synonyms : R-143a
Other means of identification : MFCD00013575

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

Use of the substance/mixture : Laboratory chemicals
Manufacture of substances
Scientific research and development

1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.
P.O. Box 309
Alachua, FL 32615 - United States of America
T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.4. Emergency telephone number

Emergency number : (844) 523-4086 (3E Company - Account 10069)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)
Simple Asphy H380 - May displace oxygen and cause rapid suffocation
Flam. Gas 1 H220 - Extremely flammable gas
Liquefied gas H280 - Contains gas under pressure; may explode if heated
Skin Irrit. 2 H315 - Causes skin irritation
Eye Irrit. 2A H319 - Causes serious eye irritation
STOT SE 3 H335 - May cause respiratory irritation

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US) :

<table>
<thead>
<tr>
<th>GHS02</th>
<th>GHS04</th>
<th>GHS07</th>
</tr>
</thead>
</table>

Signal word (GHS-US) : Danger
Hazard statements (GHS-US) :
- H220 - Extremely flammable gas
- H280 - Contains gas under pressure; may explode if heated
- H315 - Causes skin irritation
- H319 - Causes serious eye irritation
- H335 - May cause respiratory irritation
- H380 - May displace oxygen and cause rapid suffocation

Precautionary statements (GHS-US) :
- P210 - Keep away from heat/sparks/open flames/hot surfaces. No smoking
- P261 - Avoid breathing fumes, gas, mist, spray, vapors
- P264 - Wash skin thoroughly after handling
- P271 - Use only outdoors or in a well-ventilated area
- P280 - Wear protective gloves/protective clothing/eye protection/face protection
- P302+P352 - If on skin: Wash with plenty of soap and water
- P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
- P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- P312 - Call a POISON CENTER or doctor/physician if you feel unwell
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2.3. Other hazards
Other hazards not contributing to the classification: May cause frostbite.

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/information on ingredients
3.1. Substance
Substance type: Mono-constituent

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1-Trifluoroethane (Main constituent)</td>
<td>(CAS No) 420-46-2</td>
<td>&lt;= 100</td>
<td>Simple Asphy, H380</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flam. Gas 1, H220</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Liquefied gas, H280</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin Irrit. 2, H315</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Irrit. 2A, H319</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT SE 3, H335</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixture
Not applicable

SECTION 4: First aid measures
4.1. Description of first aid measures
First-aid measures general: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact: Thaw frosted parts with lukewarm water. Do no rub affected area. Get immediate medical advice/attention.

First-aid measures after eye contact: Remove contact lenses, if present and easy to do. Continue rinsing. Immediately flush eyes thoroughly with water for at least 15 minutes. Get immediate medical advice/attention.

First-aid measures after ingestion: Due to its physical form, exposure to this chemical is not likely. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed
Symptoms/injuries: The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/injuries after inhalation: May cause drowsiness or dizziness.

Symptoms/injuries after skin contact: Contact with the liquid may cause cold burns/frostbite.

Symptoms/injuries after eye contact: Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures
5.1. Extinguishing media

5.2. Special hazards arising from the substance or mixture
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Explosion hazard: Contains gas under pressure; may explode if heated. Use water spray or fog for cooling exposed containers. May form flammable/explosive vapor-air mixture.

5.3. Advice for firefighters

Firefighting instructions: In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
Protection during firefighting: Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Evacuate unnecessary personnel. Ensure adequate air ventilation. May cause suffocation by reducing oxygen available for breathing. Do not breathe gas, fumes, vapor or spray.

6.1.1. For non-emergency personnel

Emergency procedures: Only qualified personnel equipped with suitable protective equipment may intervene.

6.1.2. For emergency responders

Protective equipment: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures: Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level. Consider the risk of potentially explosive atmospheres. Eliminate every possible source of ignition.

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment: Stop leak if safe to do so.
Methods for cleaning up: Ventilate area.
Other information: For disposal of solid materials or residues refer to section 13: "Disposal considerations".

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed: Pressurized container: Do not pierce or burn, even after use. Handle empty containers with care because residual vapors are flammable. Close valve after each use and when empty.
Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, gas, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes. Keep away from ignition sources (including static discharges). Proper grounding procedures to avoid static electricity should be followed. Use only non-sparking tools.
Safe handling of the gas receptacle: Securely chain cylinders when in use and protect against physical damage.
Hygiene measures: Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures: Comply with applicable regulations.
Storage conditions: Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep container closed when not in use. Keep away from ignition sources.
Incompatible materials: Refer to Section 10 on Incompatible Materials.
Storage area: Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls: Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Systems under pressure should be regularly checked for leakage. Oxygen detectors should be used when asphyxiating gases may be released.
1,1,1-Trifluoroethane

Eye protection: Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.
Skin and body protection: Wear suitable protective clothing.
Thermal hazard protection: Cold insulating gloves.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Color</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>-111 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>-47 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>-90 °C</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>155.0 psig (@ 22 °C)</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific gravity / density</td>
<td>0.942 g/ml (@ 30 °C)</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>84.04 g/mol</td>
</tr>
<tr>
<td>Solubility</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
</tbody>
</table>

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep away from heat, sparks and flame.

10.5. Incompatible materials

Alkali metals. Finely divided metals (Al, Mg, Zn). Strong oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.
SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Not classified

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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>&gt; 591.000 ppm/4h</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Causes skin irritation.
Serious eye damage/irritation: Causes serious eye irritation.
Respiratory or skin sensitization: Not classified
Germ cell mutagenicity: Not classified
Carcinogenicity: Not classified
Reproductive toxicity: Not classified
Specific target organ toxicity (single exposure): May cause respiratory irritation.
Specific target organ toxicity (repeated exposure): Not classified
Aspiration hazard: Not classified
Symptoms/injuries after inhalation: May cause drowsiness or dizziness.
Symptoms/injuries after skin contact: Contact with the liquid may cause cold burns/frostbite.
Symptoms/injuries after eye contact: Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste treatment methods: Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.
Waste disposal recommendations: Dispose of contents/container in accordance with licensed collector’s sorting instructions.
Additional information: Recycle the material as far as possible.

SECTION 14: Transport information

Department of Transportation (DOT)
In accordance with DOT

Transport document description: UN2035 1,1,1-Trifluoroethane, 2.1
UN-No.(DOT): UN2035
Proper Shipping Name (DOT): 1,1,1-Trifluoroethane
Transport hazard class(es) (DOT): 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115
## 1,1,1-Trifluoroethane

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<table>
<thead>
<tr>
<th>Hazard labels (DOT)</th>
<th>2.1 - Flammable gas</th>
</tr>
</thead>
</table>

| DOT Packaging Non Bulk (49 CFR 173.xxx) | 304 |
| DOT Packaging Bulk (49 CFR 173.xxx)     | 314;315 |
| DOT Special Provisions (49 CFR 172.102) | T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter. |
| DOT Packaging Exceptions (49 CFR 173.xxx) | 306 |
| DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) | Forbidden |
| DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) | 150 kg |

| DOT Vessel Stowage Location | B - (i) The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) “On deck only” on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded. |
| DOT Vessel Stowage Other | 40 - Stow “clear of living quarters” |
| Emergency Response Guide (ERG) Number | 115 |

| Other information | No supplementary information available. |

### TDG

No additional information available

### Transport by sea

| UN-No. (IMDG) | 2035 |
| Proper Shipping Name (IMDG) | 1,1,1-TRIFLUOROETHANE (REFRIGERANT GAS R 143a) |
| Class (IMDG) | 2 - Gases |

### Air transport

| UN-No. (IATA) | 2035 |
| Proper Shipping Name (IATA) | 1,1,1-Trifluoroethane |
| Class (IATA) | 2 |

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### SECTION 15: Regulatory information

#### 15.1: US Federal regulations

<table>
<thead>
<tr>
<th>1,1,1-Trifluoroethane (420-46-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the United States TSCA (Toxic Substances Control Act) inventory</td>
</tr>
</tbody>
</table>

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory.

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

#### 15.2: International regulations

##### CANADA

<table>
<thead>
<tr>
<th>1,1,1-Trifluoroethane (420-46-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the Canadian DSL (Domestic Substances List)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WHMIS Classification</th>
<th>Class A - Compressed Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class B Division 1 - Flammable Gas</td>
</tr>
</tbody>
</table>

### EU-Regulations

No additional information available
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National regulations

<table>
<thead>
<tr>
<th>1,1,1-Trifluoroethane (420-46-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed on the AICS (Australian Inventory of Chemical Substances)</td>
</tr>
<tr>
<td>Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)</td>
</tr>
<tr>
<td>Listed on the Japanese ENCS (Existing &amp; New Chemical Substances) inventory</td>
</tr>
<tr>
<td>Listed on the Japanese ISHL (Industrial Safety and Health Law)</td>
</tr>
<tr>
<td>Listed on NZIoC (New Zealand Inventory of Chemicals)</td>
</tr>
<tr>
<td>Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)</td>
</tr>
<tr>
<td>Listed on INSQ (Mexican national Inventory of Chemical Substances)</td>
</tr>
<tr>
<td>Listed on Turkish inventory of chemical</td>
</tr>
</tbody>
</table>

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

SECTION 16: Other information

Full text of H-phrases:

| Eye Irrit. 2A | Serious eye damage/eye irritation Category 2A |
| Flam. Gas 1 | Flammable gases Category 1 |
| Liquefied gas | Gases under pressure Liquefied gas |
| Simple Asphy | Simple Asphyxiant |
| Skin Irrit. 2 | Skin corrosion/irritation Category 2 |
| STOT SE 3 | Specific target organ toxicity (single exposure) Category 3 |
| H220 | Extremely flammable gas |
| H280 | Contains gas under pressure; may explode if heated |
| H315 | Causes skin irritation |
| H319 | Causes serious eye irritation |
| H335 | May cause respiratory irritation |
| H380 | May displace oxygen and cause rapid suffocation |

NFPA health hazard

3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard

4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity

0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

HMIS III Rating

Health

2 Moderate Hazard - Temporary or minor injury may occur

Flammability

4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)

Physical

0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.

12/06/2016 EN (English US) SDS ID: 1100307 7/7