SAFETY DATA SHEET

1. Identification

Product Name 2,2,2-Trifluoroethanol

Cat No. : AC139750000; AC139750025; AC139750100; AC139750250; AC139751000; AC139755000

Synonyms TFE

Recommended Use Laboratory chemicals

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information US call: 001-800-ACROS-01 / Europe call: +32 14 57 52 11
Emergency Number US:001-201-796-7100 / Europe: +32 14 57 52 99
CHEMTREC Tel. No.US:001-800-424-9300 / Europe:001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| Flammable liquids                              | Category 3 |
| Acute oral toxicity                            | Category 3 |
| Acute dermal toxicity                          | Category 4 |
| Acute Inhalation Toxicity - Vapors             | Category 4 |
| Skin Corrosion/irritation                      | Category 2 |
| Serious Eye Damage/Eye Irritation              | Category 1 |
| Reproductive Toxicity                          | Category 2 |

Label Elements

Signal Word Danger

Hazard Statements
Flammable liquid and vapor
Toxic if swallowed
Harmful in contact with skin
Harmful if inhaled
Causes skin irritation
Causes serious eye damage
Suspected of damaging fertility
Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
Call a POISON CENTER or doctor/physician if you feel unwell
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician.
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep cool
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2,2-Trifluoroethanol</td>
<td>75-89-8</td>
<td>99.8</td>
</tr>
</tbody>
</table>
4. First-aid measures

**Eye Contact**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

**Skin Contact**
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

**Inhalation**
Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

**Ingestion**
Do not induce vomiting. Call a physician or Poison Control Center immediately.

**Most important symptoms/effects**
Breathing difficulties. Causes eye burns. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

**Notes to Physician**
Treat symptomatically.

5. Fire-fighting measures

**Suitable Extinguishing Media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable Extinguishing Media**
No information available.

**Flash Point**
29°C / 84.2°F

**Autoignition Temperature**
480°C / 896°F

**Explosion Limits**

<table>
<thead>
<tr>
<th>Upper</th>
<th>42 vol %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>5.5 vol %</td>
</tr>
</tbody>
</table>

**Sensitivity to Mechanical Impact**
No information available

**Sensitivity to Static Discharge**
No information available

**Specific Hazards Arising from the Chemical**
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

**Hazardous Combustion Products**
Thermal decomposition can lead to release of irritating gases and vapors, Carbon monoxide (CO), Carbon dioxide (CO₂), Gaseous hydrogen fluoride (HF).

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

6. Accidental release measures

**Personal Precautions**
Use personal protective equipment. Remove all sources of ignition. Do not get in eyes, on skin, or on clothing.

**Environmental Precautions**
Avoid release to the environment. See Section 12 for additional ecological Information.
Methods for Containment and Clean Up

Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Take precautionary measures against static discharges.

7. Handling and storage

Handling

Use only under a chemical fume hood. Use spark-proof tools and explosion-proof equipment. Wear personal protective equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Do not ingest. Take precautionary measures against static discharges.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures

Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

9. Physical and chemical properties

Physical State

Liquid

Appearance

Colorless

Odor

Alcohol-like

Odor Threshold

No information available.

pH

5.0-7.5

Melting Point/Range

-45°C / -49°F

Boiling Point/Range

77 - 80°C / 170.6 - 176°F

Flash Point

29°C / 84.2°F

Evaporation Rate

No information available.

Flammability (solid,gas)

No information available

Flammability or explosive limits

Upper

42 vol %

Lower

5.5 vol %

Vapor Pressure

70 mmHg @ 25°C

Vapor Density

3.45

Relative Density

1.390

Solubility

No information available.

Partition coefficient; n-octanol/water

No data available

Autoignition Temperature

480°C / 896°F

Decomposition temperature

No information available.

Viscosity

1.75 mPa.s @ 25 °C

Molecular Formula

C2 H3 F3 O

Molecular Weight

100.04
10. Stability and reactivity

Reactive Hazard
None known, based on information available

Stability
Stable under normal conditions.

Conditions to Avoid
Keep away from open flames, hot surfaces and sources of ignition. Incompatible products.

Incompatible Materials
Bases, Metals, Strong oxidizing agents

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors, Carbon monoxide (CO), Carbon dioxide (CO₂), Gaseous hydrogen fluoride (HF)

Hazardous Polymerization
No information available.

Hazardous Reactions
None under normal processing

11. Toxicological information

Acute Toxicity

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral (Rat)</th>
<th>LD50 Dermal (Rat)</th>
<th>LC50 Inhalation (Rat) 6 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2,2-Trifluoroethanol</td>
<td>240 mg/kg</td>
<td>1680 mg/kg</td>
<td>470 ppm</td>
</tr>
</tbody>
</table>

Toxicologically Synergistic Products
No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation
Severe eye irritant; Irritating to skin

Sensitization
No information available.

Carcinogenicity
The table below indicates whether each agency has listed any ingredient as a carcinogen

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2,2-Trifluoroethanol</td>
<td>75-89-8</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Mutagenic Effects
Not mutagenic in AMES Test

Reproductive Effects
Possible risk of impaired fertility.

Developmental Effects
No information available.

Teratogenicity
No information available.

STOT - single exposure
None known.

STOT - repeated exposure
None known.

Aspiration hazard
No information available.

Symptoms / effects, both acute and delayed
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Endocrine Disruptor Information
No information available
Other Adverse Effects
The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity
Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2,2-Trifluoroethanol</td>
<td>Not listed</td>
<td>105 - 135 mg/L LC50 96 h</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Persistence and Degradability
No information available.

Bioaccumulation/ Accumulation
No information available

Mobility

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2,2-Trifluoroethanol</td>
<td>0.41</td>
</tr>
</tbody>
</table>

13. Disposal considerations

Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification

14. Transport information

DOT

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2929</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

TDG

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2929</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

IATA

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2929</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.*</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

IMDG/IMO

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN2929</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>6.1</td>
</tr>
<tr>
<td>Subsidiary Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>
15. Regulatory information

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>IE CSC</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2,2-Trifluoroethanol</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>200-913-6</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
</tbody>
</table>

Legend:
- X - Listed
- E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
- F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
- N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
- P - Indicates a commenced PMN substance
- R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
- S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
- T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
- XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).
- Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
- Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable
SARA 313 Not applicable
SARA 311/312 Hazardous Categorization
- Acute Health Hazard Yes
- Chronic Health Hazard Yes
- Fire Hazard Yes
- Sudden Release of Pressure Hazard No
- Reactive Hazard No

Clean Water Act Not applicable
Clean Air Act Not applicable
OSHA Occupational Safety and Health Administration Not applicable
CERCLA Not applicable
California Proposition 65 This product does not contain any Proposition 65 chemicals.

State Right-to-Know Not applicable

U.S. Department of Transportation
- Reportable Quantity (RQ): N
- DOT Marine Pollutant N
- DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations
Mexico - Grade No information available
Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
B2  Flammable liquid
D1B  Toxic materials
D2B  Toxic materials

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 29-Apr-2014
Revision Date 29-Apr-2014
Print Date 29-Apr-2014
Revision Summary
This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS