

# Material Safety Data Sheet

Trifluoroacetic Acid

## 1. Product and company identification

<b>Product name</b>	: Trifluoroacetic Acid		
<b>Synonym</b>	: Acetic acid, 2,2,2-trifluoro-; Acetic acid, trifluoro- : C2-H-F3-O2		
<b>Supplier</b>	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 or 800.874.3723	<b>Manufacturer</b>	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 or 800.874.3723
<b>Code</b>	: 0028901 0028902 0028903 0028903B 0028904 0028904B 0085183 1873080 1873960		
<b>MSDS #</b>	: 0600		
<b>Validation date</b>	: 10/19/2012.		
<b>Print date</b>	: 10/19/2012.		
<b>Responsible name</b>	: MSDS (Regulatory Specialist)		
	<b>CHEMTREC:</b> 800.424.9300 <b>OUTSIDE US:</b> 703.527.3887	<b>Material uses</b>	<b>Refer to the instruction booklet for proper and intended use. Otherwise, contact supplier for specific applications.</b>
<b>Product type</b>	: Liquid.		

## 2. Hazards identification

### Emergency overview

<b>Physical state</b>	: Liquid. [Fuming liquid.]
<b>Color</b>	: Colorless.
<b>Odor</b>	: Pungent. [Strong]
<b>Signal word</b>	: DANGER!
<b>Hazard statements</b>	: CAUSES SEVERE RESPIRATORY TRACT, DIGESTIVE TRACT, EYE AND SKIN BURNS. CAN CAUSE TARGET ORGAN DAMAGE.
<b>Precautionary measures</b>	: Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Do not get in eyes. Do not get on skin. Do not eat, drink or smoke when using this product. Keep container tightly closed. Wash thoroughly after handling.
<b>OSHA/HCS status</b>	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation. Ingestion.
<b>Potential acute health effects</b>	
<b>Inhalation</b>	: Severely corrosive to the respiratory system.
<b>Ingestion</b>	: Corrosive to the digestive tract. Causes severe burns.

10/19/2012.

1/10

### Trifluoroacetic Acid

## 2. Hazards identification

<b>Skin</b>	: Severely corrosive to the skin. Causes severe burns.
<b>Eyes</b>	: Severely corrosive to the eyes. Causes severe burns.
<b>Potential chronic health effects</b>	
<b>Chronic effects</b>	: Can cause target organ damage.
<b>Carcinogenicity</b>	: No known significant effects or critical hazards.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: No known significant effects or critical hazards.
<b>Developmental effects</b>	: No known significant effects or critical hazards.
<b>Fertility effects</b>	: No known significant effects or critical hazards.
<b>Target organs</b>	: Causes damage to the following organs: mucous membranes, upper respiratory tract, skin, eyes. May cause damage to the following organs: kidneys, lungs, liver.
<b>Over-exposure signs/symptoms</b>	
<b>Inhalation</b>	: Adverse symptoms may include the following: respiratory tract irritation coughing
<b>Ingestion</b>	: Adverse symptoms may include the following: stomach pains
<b>Skin</b>	: Adverse symptoms may include the following: pain or irritation redness blistering may occur
<b>Eyes</b>	: Adverse symptoms may include the following: pain watering redness
<b>Medical conditions aggravated by over-exposure</b>	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

## 3. Composition/information on ingredients

### United States

Name	CAS number	%
trifluoroacetic acid	76-05-1	98 - 100

### Canada

Name	CAS number	%
trifluoroacetic acid	76-05-1	98 - 100

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

10/19/2012.

2/10

## Trifluoroacetic Acid

### 4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

### 5. Fire-fighting measures

- Flammability of the product** : In a fire or if heated, a pressure increase will occur and the container may burst.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide  
halogenated compounds
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Emits toxic and corrosive fumes of carbonyl halides and halogen acids under fire conditions. The substance decomposes on contact with hot surfaces or flames producing toxic fumes.

### 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**

10/19/2012.

3/10

Life Science Research  
Pierce Biotechnology Inc. PO Box 117  
3747 N. Meridian Road Rockford, IL 61105 (815) 968-0747  
(815) 968-7316 Fax www.thermo.com

## Trifluoroacetic Acid

### 6. Accidental release measures

- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). The spilled material may be neutralized with sodium carbonate, sodium bicarbonate or sodium hydroxide. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

### 7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from alkalis. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store between the following temperatures: 20 to 25°C (68 to 77°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Separate from alkalis. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

### 8. Exposure controls/personal protection

#### Canada

#### Occupational exposure limits

No exposure limit value known.

#### Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

#### Personal protection

10/19/2012.

4/10

Life Science Research  
Pierce Biotechnology Inc. PO Box 117  
3747 N. Meridian Road Rockford, IL 61105 (815) 968-0747  
(815) 968-7316 Fax www.thermo.com

**Trifluoroacetic Acid****8. Exposure controls/personal protection**

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

**9. Physical and chemical properties**

- Physical state** : Liquid. [Fuming liquid.]
- Flash point** : [Product does not sustain combustion.]
- Color** : Colorless.
- Odor** : Pungent. [Strong]
- Molecular weight** : 114.03 g/mole
- Molecular formula** : C<sub>2</sub>H-F<sub>3</sub>-O<sub>2</sub>
- pH** : 1
- Boiling/condensation point** : 72°C (161.6°F)
- Melting/freezing point** : -15°C (5°F)
- Relative density** : 1.5
- Vapor pressure** : 11 kPa (82.5 mm Hg) [20°C]
- Vapor density** : 3.9 [Air = 1]
- Viscosity** : Dynamic: 0.813 mPa·s (0.813 cP)
- Solubility** : Easily soluble in the following materials: cold water and hot water.

**10. Stability and reactivity**

- Chemical stability** : The product is stable.
- Conditions to avoid** : No specific data.
- Incompatible materials** : Attacks many metals producing extremely flammable hydrogen gas which can form explosive mixtures with air. Reactive or incompatible with the following materials: alkalis
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

10/19/2012.

5/10

Life Science Research PO Box 117 Rockford, IL (815) 968-0747 www.thermo.com  
Pierce Biotechnology Inc. 3747 N. Meridian Road 61105 (815) 968-7316 Fax

**Trifluoroacetic Acid****11. Toxicological information****United States****Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
trifluoroacetic acid	LC50 Inhalation Vapor	Rat	10 mg/L	4 hours
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
	LD50 Intravenous	Mouse	1200 mg/kg	-
	LDLo Intraperitoneal	Mouse	150 mg/kg	-
	LDLo Oral	Rat	500 mg/kg	-

- Conclusion/Summary** : Inhalation, mouse: LC50 = 13500 mg/m<sup>3</sup>  
Inhalation, rat: LC50 = 10 gm/m<sup>3</sup>  
Inhalation, rat: TCLo = 400 mg/m<sup>3</sup> / 4 hours / 22 weeks intermittent

**Chronic toxicity**

- Conclusion/Summary** : Inhalation of the fumes may cause lung edema. Effects may be delayed. Repeated inhalation may cause chronic bronchitis.

**Irritation/Corrosion**

- Conclusion/Summary** : Not available.

**Sensitizer**

- Conclusion/Summary** : Not available.

**Carcinogenicity**

- Conclusion/Summary** : Not available.

**Classification**

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
trifluoroacetic acid	-	-	-	-	-	None.

**Mutagenicity**

- Conclusion/Summary** : Laboratory experiments have shown mutagenic effects. Not mutagenic in Ames test.

**Teratogenicity**

- Conclusion/Summary** : Not available.

**Reproductive toxicity**

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
trifluoroacetic acid	-	-	Positive	Rat - Female	Oral: 1650 mg/ kg During Pregnancy	-

- Conclusion/Summary** : Laboratory experiments have shown reproductive effects.

**Canada****Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
trifluoroacetic acid	LC50 Inhalation Vapor	Rat	10 mg/L	4 hours
	LC50 Inhalation Vapor	Rat	5000 ppm	4 hours
	LD50 Intravenous	Mouse	1200 mg/kg	-
	LDLo Intraperitoneal	Mouse	150 mg/kg	-
	LDLo Oral	Rat	500 mg/kg	-

10/19/2012.

6/10

Life Science Research PO Box 117 Rockford, IL (815) 968-0747 www.thermo.com  
Pierce Biotechnology Inc. 3747 N. Meridian Road 61105 (815) 968-7316 Fax

**Trifluoroacetic Acid****11. Toxicological information**

**Conclusion/Summary** : Inhalation, mouse: LC50 = 13500 mg/m3  
 Inhalation, rat: LC50 = 10 gm/m3  
 Inhalation, rat: TLo = 400 mg/m3 / 4 hours / 22 weeks intermittent

**Chronic toxicity**

**Conclusion/Summary** : Inhalation of the fumes may cause lung edema. Effects may be delayed. Repeated inhalation may cause chronic bronchitis.

**Irritation/Corrosion**

**Conclusion/Summary** : Not available.

**Sensitizer**

**Conclusion/Summary** : Not available.

**Carcinogenicity**

**Conclusion/Summary** : Not available.

**Classification**

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
trifluoroacetic acid	-	-	-	-	-	None.

**Mutagenicity**

**Conclusion/Summary** : Laboratory experiments have shown mutagenic effects. Not mutagenic in Ames test.

**Teratogenicity**

**Conclusion/Summary** : Not available.

**Reproductive toxicity**

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
trifluoroacetic acid	-	-	Positive	Rat - Female	Oral: 1650 mg/ kg During Pregnancy	-

**Conclusion/Summary** : Laboratory experiments have shown reproductive effects.

**12. Ecological information**

**Ecotoxicity** : Not readily biodegradable. This product shows a low bioaccumulation potential.

**United States****Aquatic ecotoxicity**

Product/ingredient name	Result	Species	Exposure
trifluoroacetic acid	Acute LC50 >1000 mg/l	Fish - Danio rerio	96 hours

**Conclusion/Summary** : Not available.

**Persistence/degradability**

**Conclusion/Summary** : Not available.

**Canada****Aquatic ecotoxicity**

Product/ingredient name	Result	Species	Exposure
trifluoroacetic acid	Acute LC50 >1000 mg/l	Fish - Danio rerio	96 hours

**Conclusion/Summary** : Not available.

**Persistence/degradability**

10/19/2012.

7/10

**Trifluoroacetic Acid****12. Ecological information**

**Conclusion/Summary** : Not available.

**Partition coefficient: n-octanol/water** : -2.1

**Bioconcentration factor** : Not available.

**Toxicity of the products of biodegradation** : The products of biodegradation are as toxic as the original product.

**Other adverse effects** : No known significant effects or critical hazards.

**13. Disposal considerations**

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Disposal of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

**14. Transport information**

Regulatory information	UN number	Proper shipping name	Classes	PG*
<b>DOT Classification</b>	UN2699	TRIFLUOROACETIC ACID	8	I
<b>IATA-DGR Class</b>	UN2699	TRIFLUOROACETIC ACID	8	I

PG\* : Packing group

**15. Regulatory information****United States**

**HCS Classification** : Corrosive material  
Target organ effects

**U.S. Federal regulations** : TSCA 8(a) IUR Exempt/Partial exemption: Not determined  
 United States inventory (TSCA 8b): This material is listed or exempted.

**SARA 302/304/311/312 extremely hazardous substances**: No products were found.

**SARA 302/304 emergency planning and notification**: No products were found.

**SARA 302/304/311/312 hazardous chemicals**: trifluoroacetic acid

**SARA 311/312 MSDS distribution - chemical inventory - hazard identification**: trifluoroacetic acid: Immediate (acute) health hazard

**Clean Air Act Section 112** : Not listed  
 (b) Hazardous Air Pollutants (HAPs)

10/19/2012.

8/10

Trifluoroacetic Acid

## 15. Regulatory information

Clean Air Act Section 602 : Not listed

Class I Substances

Clean Air Act Section 602 : Not listed

Class II Substances

DEA List I Chemicals : Not listed

(Precursor Chemicals)

DEA List II Chemicals : Not listed

(Essential Chemicals)

### State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is not listed.

United States inventory : This material is listed or exempted.

(TSCA 8b)

### Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).  
Class E: Corrosive material

### Canadian lists

Canadian NPRI : This material is not listed.

CEPA Toxic substances : This material is not listed.

Canada inventory : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

### International regulations

International lists : **Australia inventory (AICS):** This material is listed or exempted.

**China inventory (IECSC):** This material is listed or exempted.

**Japan inventory:** This material is listed or exempted.

**Korea inventory:** This material is listed or exempted.

**New Zealand Inventory of Chemicals (NZIoC):** This material is listed or exempted.

**Philippines inventory (PICCS):** This material is listed or exempted.

## 16. Other information

Label requirements : CAUSES SEVERE RESPIRATORY TRACT, DIGESTIVE TRACT, EYE AND SKIN BURNS. CAN CAUSE TARGET ORGAN DAMAGE.

Hazardous Material :  
Information System (U.S.A.)

Health	3
Flammability	0
Physical hazards	0

The customer is responsible for determining the PPE code for this material.

National Fire Protection :  
Association (U.S.A.)

10/19/2012.

9/10

Life Science Research PO Box 117 Rockford, IL (815) 968-0747 www.thermo.com  
Pierce Biotechnology Inc. 3747 N. Meridian Road 61105 (815) 968-7316 Fax

Trifluoroacetic Acid

## 16. Other information



Date of printing : 10/19/2012.

Date of issue : 10/19/2012.

Date of previous issue : 6/13/2012.

Version : 1.02

Prepared by : MSDS (Regulatory Specialist)

Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

10/19/2012.

10/10

Life Science Research PO Box 117 Rockford, IL (815) 968-0747 www.thermo.com  
Pierce Biotechnology Inc. 3747 N. Meridian Road 61105 (815) 968-7316 Fax