1.1 Product Identifier
Name: TFAA or Trifluoroacetic Anhydride
Code: 1-270084-500, 1-270841-200, 1-270843-200

1.3 Details of Manufacturer/Supplier
Company: Regis Technologies, Inc.
Address: 8210 N. Austin Avenue, Morton Grove, IL 60053
Telephone: 847-967-6000; 800-323-8144 (toll free)
Email: cservice@registech.com
Website: www.registech.com

1.4 Emergency Telephone
INFOTRAC 800-535-5053 [U.S.A.]

2.1 Classification of the Substance or Mixture
GHS Classification
<table>
<thead>
<tr>
<th>Health Hazards</th>
<th>Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity (inhalation)</td>
<td>Category 4</td>
<td>H332</td>
</tr>
<tr>
<td>Skin Corrosion / Irritation</td>
<td>Category 1A</td>
<td>H314</td>
</tr>
<tr>
<td>Serious Eye Damage / Irritation</td>
<td>Category 1</td>
<td>H314</td>
</tr>
</tbody>
</table>

GHS Label Elements
Pictograms or hazard symbols

Signal Word Danger

Hazard Statement
H314 – Causes severe skin burns and eye damage.
H332 – Harmful if inhaled.
H412 – Harmful to aquatic life with long lasting effects.
EUH014 – Reacts violently with water.

Precautionary Statements
P232 – Protect from moisture.
P273 – Avoid release to the environment.

P303+P361+P353 – IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Name: TFAA or Trifluoroacetic Anhydride  
Code: 1-270084-500, 1-270841-200, 1-270843-200

SAFETY DATA SHEET

**P305+P351+P338** – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**P314** – Get medical advice/attention if you feel unwell.

**[Storage]**  
P402+P404 – Store in a dry place. Store in a closed container.
P403+P235 – Store in a well-ventilated place. Keep cool.

SECTION 3 ............................................  COMPOSITION / INFORMATION ON INGREDIENTS ...............................................................  

Name TFAA or Trifluoroacetic Anhydride
Synonyms 2,2,2-Trifluoroacetic anhydride

### Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trifluoroacetic Anhydride</td>
<td>Acute Tox 4; Skin Corr. 1A; Eye Corr. 1;</td>
<td>≥ 99-100 %</td>
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<tr>
<td>CAS No. 407-25-0</td>
<td>Chronic Aq.; EUH014; H314; H332; H412</td>
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<tr>
<td>EC No. 206-982-9</td>
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</tr>
</tbody>
</table>

For full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4 ...................................................................  FIRST AID MEASURES .....................................................................................

4.1 Description of first aid measures

**General:** Do not attempt to neutralize as it frequently makes matters worse.

**Eye contact:** Rinse eyes with plenty of water for at least 15 minutes; lift eyelids occasionally. If irritation persists, consult physician.

**Skin contact:** Immediately remove contaminated clothing and shoes, then wash skin with soap and plenty of water. If irritation persists, consult physician.

**Inhalation:** Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and keep person warm and at rest. Consult physician.

**Ingestion:** Give large amounts of water or milk (two glasses at most). Avoid vomiting. Consult physician immediately. Do not attempt to neutralize.

**Physician note:** Symptomatic and supportive care. There is no specific antidote.

4.2 Most important symptoms and effects, both acute and delayed.
Causes severe skin burns and eye damage. Risk of blindness.

4.3 Indication of immediate medical attention and special treatment needed.
No data available.

SECTION 5 ...............................................................  FIRE-FIGHTING MEASURES ..................................................................................

5.1 Suitable Extinguishing Media
Carbon dioxide, dry chemical powder, dry sand.

5.2 Specific hazards arising from the chemical.
Violently reacts with water to produce the strong acid trifluoroacetic acid (TFA) (CAS No. 422-64-0). Water spray may be used to cool fire-exposed containers. Emits toxic fumes under fire conditions. Produces carbon oxides, hydrogen fluoride upon combustion.

5.3 Advice for fire-fighters
Wear personal protective equipment for corrosive acidic vapor conditions. Wear self-contained breathing apparatus (SCBA) if necessary.
SECTION 6 ............................................... ACCIDENTAL RELEASE MEASURES .................................................................

6.1 Personal precautions, protective equipment, and emergency procedures
For non-emergency personnel - Do not breath vapors or mists. Avoid material contact. Evacuate unnecessary personnel from area, observe emergency procedures, consult an expert.

For emergency responders – Protective equipment for corrosive acidic vapor conditions. See Section 8.3.

6.2 Environmental precautions
Prevent material from entering drains. Risk of violent reaction and formation of trifluoroacetic acid.

6.3 Methods of clean up
Evacuate unnecessary people from area. Isolate spilled material. Ventilate area. Eliminate all ignition sources. Use spark proof tools. Neutralize with sodium bicarbonate or other suitable neutralizing agent. If neat or in solution, mix with sand or similar inert adsorbent material or spill pillow. Sweep up, seal in appropriate hazardous waste container, and hold for proper waste disposal. Keep out of water supplies and sewers. Wash spill site after material pickup is complete.

SECTION 7 ....................................................... HANDLING AND STORAGE ...................................................................................

7.1 Safe Handling Precautions
Wear suitable protective equipment to avoid contact with skin, eyes, or inhalation of corrosive acidic vapors. Wash thoroughly after handling. Immediately remove contaminated clothing. Handle in a dry, well ventilated area. Use local exhaust if vapor can be generated. Keep away from ignition sources. Take precautionary measures against static discharge. Handle under nitrogen. Protect from moisture. Water/moist air contact produces trifluoroacetic acid.

7.2 Storage Conditions
Store under inert gas in a tightly sealed container. Store in a cool, dry place suitable for flammable and corrosive materials. Protect from moisture, ignition sources, and away from alkaline, acidic and oxidizing materials.

SECTION 8 .......................................... EXPOSURE CONTROLS / PERSONAL PROTECTION .........................................................................

8.1 Control parameters
    Exposure limits Trifluoroacetic anhydride – No data available.
    Environmental Do not empty into drains. Harmful for aquatic organisms due to acid pH.

8.2 Appropriate engineering controls
Safety shower and eye wash
Local exhaust and mechanical ventilation required. Hood recommended. Fume scrubber.

8.3 Personal protection
Eye/face Chemical safety eyewear or goggles
Hand Compatible chemical-resistant gloves: Rubber (e.g., natural rubber, neoprene, nitrile, or equivalent), Silver Shield®, Viton®
Respiratory NIOSH/MSHA or European Standard EN 149 approved respirator for organic/acid gas, dust, and mists if exposure limits are exceeded or irritation or other symptoms are experienced.
Dermal (not hand) Protective Clothing (e.g., lab coat)–flame retardant anti-static material recommended.
Hygiene Avoid inhalation, ingestion; contact with eyes, skin, and clothing; and prolonged or repeated exposure. Wash thoroughly after handling. Wash contaminated clothing before reuse. Discard contaminated footwear.

Abbreviations: NA—not applicable; NE—not established; U—unknown/Not available; NL—not listed; N—no; Y—yes.
SECTION 9 ........................................................................................................ PHYSICAL AND CHEMICAL PROPERTIES ..............................................................................

9.1 Information on physical and chemical data

- **Chemical Formula**: C$_4$F$_6$O$_3$
- **Molecular Weight**: 210.03
- **Form**: liquid
- **Appearance**: clear, colorless
- **Odor**: pungent, strong
- **Odor threshold**: No data available
- **pH**: < 1
- **Melting/freezing point**: -63.5 °C (-82.3 °F)
- **Boiling point**: 39.5-40 °C (103 °F)
- **Flammability**: Not applicable
- **Flash Point**: Not applicable
- **Flammable limits (%v/v)**: LEL (lower explosive limit) Not applicable
- **Autoignition temperature**: No data available
- **Decomposition temperature**: No data available
- **OSHA Flammability Class**: No data available
- **Evaporation Rate (BuAc = 1.0)**: No data available
- **Vapor pressure (mmHg)**: No data available
- **Vapor density (air=1)**: 3.9 @ 20°C (68°F) (trifluoroacetic acid)
- **Relative density (g/cm$^3$)**: 1.487
- **Water Solubility**: Decomposes/ hydrolyzes, hygroscopic
- **Water reactive**: Yes—violently hydrolyzes to form trifluoroacetic acid
- **Solubility (other)**: Soluble in halogenated solvents; insoluble in polar solvents.
- **Partition coefficient: N-octanol/water**: Log Pow = 0.79 (trifluoroacetic acid)
- **Viscosity**: No data available

SECTION 10 ..................................................................................................... STABILITY AND REACTIVITY ............................................................................................

10.1 Reactivity
- Reactive to water or moisture.

10.2 Chemical Stability
- Stable if stored under nitrogen and protected from moisture and heat.

10.3 Possibility of hazardous reactions
- Decomposes on contact with water or moist air to form corrosive trifluoroacetic acid.

10.4 Conditions to avoid
- Avoid incompatibilities.
- Protect from heat and ignition sources.
- Keep out of water supplies and sewers.

Abbreviations: NA—not applicable; NE—not established; U—unknown/Not available; NL—not listed; N—no; Y—yes.
10.5 Incompatible materials
- Alkalies or metals
- Strong bases
- Strong oxidizers or reducing agents
- Moist air or water

10.6 Hazardous decomposition products
- Combustion: carbon oxides, hydrogen fluoride
- Decomposition: trifluoroacetic acid, a strong acid

SECTION 11 ......................................................... TOXICOLOGICAL INFORMATION..............................................................................

11.1 Toxicological Information

Acute toxicity
- Oral: No data available.
- Dermal: No data available.
- Inhalation: Harmful if inhaled. (Trifluoroacetic acid: NOEC, ihl rat 300mg/m3, 4H, vapor)

Skin corrosion/irritation: Corrosive. Can cause severe skin burns.

Serious eye damage/irritation: Corrosive. Can cause eye burns, blindness, lacrimation, and destruction of mucous membranes. Based on skin corrosivity.

Respiratory irritation: No data available.

Respiratory or skin sensitization: No data available

Germ cell mutagenicity: No data available

Carcinogenicity: No data available

IARC: No data available

NTP: No data available

Reproductive toxicity: No data available

STOT-single exposure: No data available

STOT-repeated exposure: No data available

Aspiration hazard: No data available

RTECS Number: AJ9800000

SECTION 12 ............................................................ ECOLOGICAL INFORMATION.................................................................................

12.1 Ecotoxicity
- Toxicity to Fish: No data available.
- Toxicity to Crustacea: No data available.
- Toxicity to Aq. Plants: No data available.
- Toxicity to Bacteria: No data available.

12.2 Persistence and degradability: No data available.

12.3 Bioaccumulative potential: BCF = no data available and Log Kow = no data available.

12.4 Motility in soil: No data available.
12.5 Results of PBT and vPvB assessment  
No data available.

12.5 Other adverse effects  
Additional ecological information  
No data available on TFAA. Contact with water produces trifluoroacetic acid (TFA). Harmful for aquatic organisms due to acid pH. Do not discharge into the environment.

SECTION 13 ........................................................... DISPOSAL CONSIDERATIONS ..............................................................

13.1 Disposal methods  
U.S. EPA Waste Codes  
D002  
Waste Characterization (per U.S. regulations)  
RCRA Hazard Class (40CFR 261): Corrosive  
Generator is responsible for proper waste characterization. NOTE: U.S. Federal and state hazardous waste regulations may differ considerably.
Waste Disposal  
That which cannot be recovered or recycled, should be disposed of in accordance with all applicable international, national, regional, state, and local laws. Do NOT dump into any sewer, on ground, or into any body of water.

SECTION 14 ............................................................ TRANSPORT INFORMATION ..............................................................

14.1 UN number  
UN 3265  
14.2 UN proper shipping name  
Corrosive liquid, acidic, organic, n.o.s. (trifluoroacetic anhydride)  
14.3 Transport Hazard Class  
8  
14.5 Packing group  
PG I  
14.6 Environmental hazards  
Not applicable  
14.6 Special precautions for user  
See Section 8 for exposure/personal protection guidance.

SECTION 15 ........................................................... REGULATORY INFORMATION ..............................................................

15.1 Safety, health and Environmental regulations specific for the product in question.

NFPA: H3 F3 R2 (avoid water)  
HMIS: H3 F3 R2

15.2 Chemical Inventory Lists

Reviews, Standards, and Regulations

Trifluoroacetic Anhydride

CAS number: 407-25-0

TSCA: Y

This compound is sold strictly for FDA or research and development use.

EINECS: 206-982-9

CERCLA [Section 103 (40 CFR 302.4)]: NL
RQ (lbs): NA

RCRA Waste Code: NA

Clean Air Act

[Section 112r (40 CFR 68)]: NL
TQ (lbs): NA

Contains Ozone Depleters (Class I or Class II): N

SARA Title III Notification [40 CFR 302.4]:

Section 302/304 (EHS) Ingredient

[40 CFR 355.3]: NL
TPQ (lbs): NA

RQ (lbs): NA

Section 313 Ingredient [40 CFR 372.65]: NL

SARA Hazards

Acute..........Y Chronic..... N Fire ..... N Pressure..... N Reactivity ..... Y

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Code: 1-270084-500, 1-270841-200, 1-270843-200

Reviews, Standards, and Regulations (continued)

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<td>CAS number</td>
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<td>407-25-0</td>
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<tr>
<td>OSHA Process Safety</td>
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<td>[29 CFR 1910.119]</td>
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<tr>
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<td>TQ (lbs)</td>
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<td>On CA 65 Significant Risk Level</td>
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SECTION 16

16.1 Full test of H-Statements referred to under Section 2 and 3.

- Acute Tox. Acute toxicity
- Chronic Aq. Acute chronic toxicity
- EUH014 Reacts violently with water.
- Eye Dam. Serious eye damage
- H314 Causes severe skin burns and eye damage.
- H332 Harmful if inhaled.
- H412 Harmful to aquatic life with long lasting effects.
- Skin Corr. Skin corrosion

The above information is believed to be correct to the best of our present state knowledge, but does not purport to be all-inclusive and shall be used only as a guide. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.

Prepared by: Regis Technologies

This is the last page of this MSDS.