



**ANGARSK
ELECTROLYSIS
CHEMICAL
COMPLEX**

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MATERIAL SAFETY DATA SHEET

TRIFLUOROMETHANESULFONIC ACID ANHYDRIDE, MIN. 99.5 MASS %

Date: March 31, 2004

SECTION 1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

MSDS Name: Trifluoromethanesulfonic acid anhydride, min. 99.5 mass %
Catalog numbers: CAS 358-23-6, EINECS 206-616-8
Use of the substance: Intermediate compound for organic synthesis in agrochemical, pharmaceutical and chemical industries.
Synonyms: Triflic Anhydride
Company name: Federal State Unitary Enterprise "Angarsk Electrolysis Chemical Complex"
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SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical name: Trifluoromethanesulfonic acid anhydride
Assay, mass %: 99.5
CAS no.: 358-23-6
EINECS: 206-616-8
Hazard symbols: C
Risk phrases: R 14, R 34 (see Section 16 for full text)

SECTION 3. HAZARDS IDENTIFICATION

Reacts violently with water. Causes burns. Hygroscopic.

Eyes: Causes eye burns
Skin: Causes burns

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| Ingestion: | Causes gastrointestinal tract burns |
| Inhalation: | May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Inhalation of large quantities may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. |
| Chronic: | No data available |

SECTION 4. FIRST AID MEASURES

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| Eyes: | Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. |
| Skin: | Remove contaminated clothing and shoes. Immediately flush skin with plenty of water for at least 15 minutes. Get medical aid immediately. |
| Ingestion: | Do not induce vomiting. Wash mouth out with water. Get medical aid immediately. |
| Inhalation: | Remove from exposure to fresh air. Get medical aid immediately. If not breathing, give artificial respiration. |

SECTION 5. FIRE-FIGHTING MEASURES

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| General information: | Wear a self-contained breathing apparatus and full protective gear. Irritating and highly toxic gases may be produced by fire owing to thermal decomposition. The substance causes violent reaction with water. |
| Extinguishing media: | Use foam, powder or carbon dioxide fire extinguishers. Do not use water. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

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| General information: | Use proper personal protective equipment as indicated in Section 8 of this Safety Data Sheet. |
| Spills/leaks: | Absorb spill with powder material containing alkaline component (e.g. limestone, dolomite, soda ash) or dry sand (soil), then place in acid-proof tightly closing container. The place of spillage should be treated with 5% sodium carbonate solution, then flushed with plenty of water. The flushing water then should be collected using adequate equipment into an appropriate container for disposal according to applicable national and regional regulations. |

SECTION 7. HANDLING AND STORAGE

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| Handling: | Do not inhale vapor. Do not get in eyes, on skin, or on clothing. Do not permit contact with water. All handling procedures should include the use of local ventilation. |
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Storage: Store in a tightly closed AISI 304 stainless steel container provided by manufacturer. Recommended sealing material: Teflon. Store in a cool, dry place in an area intended for corrosives. Do not allow contact with airborne moisture. The premises should be equipped with common air exchange ventilation.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit values: Maximum permissible concentration in working area air: 5 mg/m³ (for Russia). No data available for other countries.

Occupational safety: Working place should be equipped with appropriate eyewash facility and emergency shower. The working place should be equipped with local exhaust ventilation and the premises must have common air exchange ventilation to keep airborne concentrations low.

Respiratory protection: Wear anti-gas filtering respirator; when necessary, wear a respirator equipped with canister for acidic gases.

Hand protection: Wear protective acid-proof PVC gloves.

Eye protection: Wear protective closely fitting colorless glass goggles or face shield.

Skin protection: Wear acid-proof full protective suit, acid-proof rubber boots; if necessary, wear plastic or polyethylene apron and sleeve-protectors or robe.

Industrial hygiene: Do not eat or drink at workplace. Observe the personal hygiene rules.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless transparent liquid

Odor: Pungent

Boiling point: 81–83°C @ 745 mm Hg

Flash point: Not applicable

Flammability: Non-flammable

Explosive properties: Non-explosive

Oxidizing properties: Non-oxidant

Vapor pressure: 8 mm Hg @ 20°C

Relative density: 1.6770 g/cm³

Solubility in water: Reacts with water producing Trifluoromethanesulfonic acid CF₃SO₃H

Viscosity: 13×10⁻³ m²/c @ 25°C

Melting point: -80°C

Decomposition point: No data available

Molecular mass: 282.13

Molecular formula: C₂F₆O₅S₂

SECTION 10. STABILITY AND REACTIVITY

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| Chemical stability: | Stable under normal conditions |
| Conditions to avoid: | Avoid contact with water and airborne moisture |
| Materials to avoid: | Incompatible with water, strong oxidants, strong bases, alcohols, alkali |
| Decomposition products: | Thermal decomposition may produce carbon oxides, sulfur oxides and hydrogen fluoride |
| Polymerization: | Does not polymerize |

SECTION 11. TOXICOLOGICAL INFORMATION

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| LD₅₀ (oral, rats): | 3600 µg/kg (exposure within 4 hours) |
| LC₅₀ (inh., rats): | No data available |
| Skin contact: | When in contact with skin, no toxicological effect is produced |
| Carcinogenicity: | Not listed by ACGIH, IARC, NIOSH, NTP or OSHA. For full information refer to RTECS. |

SECTION 12. ECOLOGICAL INFORMATION

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| Ecotoxicity: | The substance should not be allowed to get into reservoirs, ponds, groundwater and sewage systems. |
| Mobility: | No data available |
| Persistence and degradability: | No data available |
| Bioaccumulative potential: | No data available |

SECTION 13. DISPOSAL CONSIDERATIONS

The product should be disposed of according to federal, national and regional regulations.

SECTION 14. TRANSPORT INFORMATION

14.1. ICAO/IATA

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| Shipping name: | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Trifluoromethanesulfonic acid anhydride) |
| Hazard class: | 8 |
| UN number: | 3265 |
| Packing group: | II |

14.2. IMDG

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|-----------------------|--|
| Shipping name: | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Trifluoromethanesulfonic acid anhydride) |
| Hazard class: | 8 |
| UN number: | 3265 |

Packing group: II

14.3. RID/ADR

Shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
(Trifluoromethanesulfonic acid anhydride)

Hazard class: 8

UN number: 3265

Packing group: II

SECTION 15. REGULATORY INFORMATION

Labeling in accordance with international regulations.

SECTION 16. OTHER INFORMATION

Hazard symbols: C

Risk phrases: R 14 Reacts violently with water
R 34 Causes burns

Safety Phrases: S 8 Keep container dry
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)

Original date of issue: March 31, 2004

Date of the latest revision: March 31, 2004

The information above is believed to be accurate and represents the best information currently available to us.

General Director of AECC

Mr. V. P. Shopen