



Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the "Rules for Hazardous Chemicals Labeling and General Regulations".

I. Chemicals and Manufacturer Information

1.1. Chemical Name

3M(TM) Ionic Liquid Antistat FC-4400

Other names:None

Product Identification Number

98-0212-3512-6 98-0212-3518-3 98-0212-4845-9 98-0212-4849-1 98-0212-4916-8

1.2. Recommended Uses and Restricted Uses

Recommended Uses

Additive; anti-static additive.

Usage Restrictions

3M EMSD does not intend to intentionally supply this product for sampling, technical support, or sales to medical or pharmaceutical products intended for temporary or permanent implantation into humans or animals. Customers shall bear sole responsibility for evaluating and determining whether 3M EMSD products are suitable for their specific uses and applications. The conditions under which 3M products are evaluated, selected, and used may vary significantly and will impact the product's application and expected use. Since many of these conditions fall within the knowledge and control of the user, the user must evaluate and determine whether 3M products are suitable for the specific use and expected application, and whether they comply with all applicable local laws, regulations, standards, and guidelines.

1.3. Names, Addresses, and Telephone Numbers of the Manufacturer, Importer, or Supplier

Name: Taiwan Minnesota Mining & Manufacturing Co., Ltd.
Address: 115018,3rd Floor, No.198 Jingmao 2nd Road, Nangang District, Taipei City
Contact phone number: (02) 2785-9338
URL: www.3m.com.tw

1.4. Emergency Contact Number / Fax Number

Emergency contact number:886-3-4783600

Fax numbers: (03) 475-0924,475-0904)

II. Hazard Identification Data

2.1. Chemical Hazard Classification

Acute toxic substances (ingestion): Category 4

Acute toxic substances (skin): Grade 5

Reproductive toxic substances: Category II – Specific target organ systems toxicity; repeated exposure; Category I – Hazardous substances in aquatic environments (acute toxicity); Category III.

Hazardous substances in water environments (chronic toxicity): Grade 3

2.2. Label Information

Warning Statement

Dangerous

Symbolic Symbols

Exclamation Mark: Health Hazards

Hazard Diagram



Hazard Warning

Message H302

H313

H361

Ingestion of harmful substances (oral route)

Skin contact may be harmful.

Suspected harm to fertility or to the fetus

H372

Long-term or repeated exposure can cause organ damage: the

H412

endocrine system is harmful to aquatic organisms and exerts long-

lasting, persistent effects.

Hazard Prevention Measures

Prevention:

P260

Do not inhale dust, fumes, gases, mist droplets, vapors, or sprays.

Waste Management:

P501

Disposal of contents or containers (in accordance with local, regional, national, or international regulations).

2.3. Other Hazards

Unknown

3. Three-Dimensional Resolution Data

Pure substance

Chemical properties: See Section 9 of this SDS.

Chinese and English Names	Chemical Abstracts Service Registration Number	Concentration or concentration range (component percentage)
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		(CAS No.)	
Tri-n-butylammonium bis (trifluoromethanesulfonate)imide salt	1-Butanaminium, N,N dibutyl-N-methyl-, salt with 1,1,1- trifluoro-N- [(trifluoromethyl)su lfonyl]methanesulfon amide (1:1)	405514-94-5	> 99

Mixture is not applicable.

IV. First Aid Measures

4.1. First Aid Procedures for Different Exposure Routes

Inhalation:

Move the person to a well-ventilated area. If they feel unwell, seek medical attention immediately.

Skin contact:

Wash with soap and water. If symptoms persist, seek medical attention immediately.

Eye exposure:

Rinse thoroughly with plenty of water. If it is easy to remove your contact lenses, do so; continue rinsing. If any signs or symptoms persist, seek medical attention immediately.

Intake:

Use for rinsing your mouth. If you experience any discomfort, seek medical attention immediately.

4.2. Most Important Symptoms and Adverse Effects

For information on the effects of prolonged or repeated exposure on target organs, please refer to Section 11.

4.3. Protective Measures for Emergency Medical Personnel

Please refer to the information in other sections of this Safety Data Sheet for information on potential hazards to the body and health, respiratory protection, ventilation, and personal protective equipment.

4.4. Tips for Physicians

Not applicable

V. Fire Suppression Measures

5.1. Applicable Extinguishing Agents

In case of fire: Use an extinguishing agent suitable for common combustible materials (such as water or foam) to extinguish the fire.

5.2. Special Hazards That May Arise During Firefighting Operations

Under overheating conditions, thermal decomposition may occur. Please refer to the health hazard data.

Hazardous decomposition products or by-products

Substances

Amine compounds

Conditions

During the combustion process

Carbonyl fluoride	During the combustion process
Carbon monoxide	During the combustion process
Carbon dioxide	During the combustion process
Hydrogen fluoride	During the combustion process
Nickel salt	During the combustion process
Sulfur dioxide	During the combustion process
Toxic vapors, gases, and particulate matter	During the combustion process

5.3. Special Fire Extinguishing Procedure

Wear a full set of protective gear, including a helmet, independent breathing apparatus (positive pressure or pressure-demand type), a protective vest and trousers, arm guards, waist harnesses, leg harnesses, a face shield, and a protective cover for the head exposure area.

5.4. Special Protective Equipment for Firefighters

No available information

VI. Leak Handling Procedures

6.1. Important Notes for Individuals

Evacuate the site and ensure proper ventilation. In cases of large-scale spills or spills occurring in enclosed spaces, mechanical exhaust systems should be installed in accordance with Good Industrial Hygiene Practices to disperse the fumes or evaporates to form vapors. For information regarding potential hazards to the body and health, respiratory protection, ventilation systems, and personal protective equipment, please refer to other sections of this Safety Data Sheet.

6.2. Environmental Precautions

Avoid emissions into the environment.

6.3. Cleaning Method

Collect spilled materials; use wet cleaning agents or water to prevent dust contamination; place the collected materials in a sealed container approved by the competent authority; remove residual substances from the container. Equipment sealing. Handle collected waste materials as soon as possible in accordance with local, regional, national, or international regulations.

7. Safety Handling and Storage Methods

7.1. Disposal

Do not inhale thermal decomposition products. For industrial and occupational use only. Not suitable for consumer sale or use. Do not dispose of this product without first understanding all safety precautions. Do not inhale dust, fume, gas, mist droplets, vapor, or spray. Take extreme care to prevent exposure to eyes, skin, or contamination of clothing. When using this product, do not eat, drink, or smoke. Thoroughly wash hands after handling. Avoid releasing the product into the environment. Use personal protective equipment (such as gloves, respirators) as required.

7.2. Storage

No special storage requirements.

8. Exposure Prevention Measures

8.1. Control Parameters

8-hour time-weighted average permissible concentration / Short-term exposure limit / Maximum permissible concentration:None of the components listed in Section 3 of this Safety Data Sheet have occupational exposure limits.

Biological indicators

None of the components listed in Section 3 of this Safety Data Sheet have biological indicator values.

8.2. Exposure Control

8.2.1. Engineering Control

If overheating resulting from improper use or instrument malfunction leads to thermal decomposition, ensure adequate local ventilation to reduce the concentration of thermal decomposition products below the exposure limit; employ standard dilution ventilation equipment and/or local exhaust ventilation equipment to control airborne suspended contaminants below the relevant exposure limits and/or to mitigate dust, smoke, gases, fumes, vapors, or sprays. In cases of insufficient ventilation, respiratory protective equipment shall be used.

8.2.2. Personal Protective Equipment (PPE)

Eye/Facial Protection

Select and use eye or facial protective equipment based on the results of the contact exposure assessment. The recommended eye or facial protective gear is: safety goggles equipped with side shields.

Skin and Body/Hand Protection

Based on the exposure assessment results, gloves and/or protective clothing that comply with local standards should be selected and used to prevent skin contact. Selection should be based on relevant usage factors, such as the degree of exposure, the concentration of the substance or mixture, the frequency and duration of use, and physical environmental challenges—such as extreme temperatures and other operating conditions. Please consult your glove and/or protective clothing manufacturer to select the most appropriate protective equipment. It is recommended to use gloves made of the following material: nitrile rubber.

Respiratory Protection

An exposure assessment may be required to determine whether a respirator is necessary. If a respirator is needed, it should be used as part of the overall respiratory protection plan. Based on the results of the exposure assessment, select from the following respirator types to reduce inhalation exposure:

In cases where materials may be exposed to extreme overheating due to misuse or equipment failure, use a positive-pressure breathing apparatus.

Suitable for half-face or full-face N95 respirators designed to protect against organic vapors and particulate matter.

For questions regarding the suitability of specific applications, please consult your respirator manufacturer.

8.3. Hygiene Measures

Section 7.1: Safety Handling Precautions

9. Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties Data

Physical state	Solid
Specific physical morphology:	Crystals (transparent liquid or crystalline grayish-white solid)
Color	Colorless; off-white; transparent amber.
Odor	No odor
Olfactory threshold	No available data
pH value	4.7 -5.3 [Detailed Description:Saturated Solution]
Melting point/Freezing point	26 -29°C [Detailed description:Melting point determined by DSC; slow melting process]
Boiling point / Initial boiling point / Boiling range	> 429 °C
Flash point	No flash point
Evaporation rate	No available data
Flammable	Not applicable

Lower Explosive Limit (LEL)	<i>Not applicable</i>
Explosion Limit (UEL)	<i>Not applicable</i>
Vapor pressure	<13.3 Pa [@270°C]
Vapor density and/or relative vapor density	<i>Not applicable</i>
Density	1.26 kg/cm ³
Relative density	1.26 [Reference standard: Water = 1]
Solubility	≤1,000 mg/L
Solubility – Non-aqueous media	<i>No available data</i>
Octanol/water partition coefficient (log Kow)	<i>No available data</i>
Self-ignition temperature	450 Celsius
Decomposition temperature	429 °C [Detailed explanation:(The activation temperature is determined by TGA analysis)]
Dynamic viscosity	421 Square millimeters per second
Volatile Organic Compounds	<i>No available data</i>
Volatile fraction	<i>No available data</i>
Volatile Organic Compounds (VOCs), no water required, and no solvents needed.	<i>No available data</i>
Average particle size	<i>No available data</i>
堆积密度	<i>No available data</i>
Molecular weight	<i>No available data</i>
Softening point	<i>No available data</i>

Granule characteristics	<i>Not applicable</i>
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Section 10: Stability and Reactivity

10.1. Reactivity

Under normal operating conditions, this material is considered non-reactive.

10.2. Stability

Stable.

10.3. Potential Adverse Reactions Under Special Circumstances

No hazardous polymerization reactions will occur.

10.4. Conditions to Avoid

No

10.5. Substances to Avoid

No

10.6. Hazardous Decomposition Products

Substances

No

Conditions

For information regarding the hazardous decomposition products generated during the combustion process, please refer to Section 5.2.

Improper use or equipment failure that exposes the product to high-temperature environments may lead to the formation of toxic decomposition products, including hydrogen fluoride (HF) and perfluoroisobutylene; under conditions of misuse or equipment malfunction, the extreme heat generated can produce hydrogen fluoride as one of its decomposition products.

XI. Toxic Data

The following information may not align with the material classification specified in Section 2, particularly when the classification of a specific component is authorized by the competent authority. Additionally, toxicological data for a component may not be reflected in the hazard and/or exposure indicators for the material, if the concentration of a particular component is below the required labeling threshold, or if no exposure may occur for that component, or if this information may not be relevant to the overall material.

11.1. Toxicological Impact-Related Data

Exposure routes/Symptoms

Based on test data and/or information regarding its composition, it is known that this material may have the following effects on health:

Inhalation:

Respiratory irritation: Signs and symptoms include coughing, sneezing, runny nose, headache, hoarseness, and pain in the nose or throat.

Skin contact:

Contact with the skin may be harmful; mechanical skin irritation may present with signs or symptoms such as abrasions, redness, pain, and itching.

Eye exposure:

Eye irritation caused by mechanical grinding: Signs and symptoms include irritation, redness, corneal injury, and tearing.

Swallowing:

Ingestion of harmful substances (oral route) may lead to other health effects (see below).

Other health effects:

Chronic toxicity or long-term toxicity

Prolonged or repeated exposure may affect the target organ:

Endocrine effects: Symptoms or manifestations may include impairment of gonadal, thyroid, adrenal, or pancreatic function; alterations in hormone production; disruption of hormonal balance; and/or changes in hormone levels within tissues.

Reproductive/Developmental Toxicity:

Contains one or more chemicals that may cause birth defects or other reproductive hazards.

Toxicological Data

If a component is listed in Section 3 but does not appear in the table below, this indicates that no data are available at this stage or that the available data are insufficient for classification.

Acute toxicity

Name	Exposure routes	Types	Numerical values
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Skin	Rat	LD50> 2,000 mg/kg
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Swallowing	Rat	LD50:300–2000 mg/kg

ATE = Acute Toxicity Estimate

Skin corrosion/irritation

Name	Types	Numerical values
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Rabbit	No significant stimulation

Severe eye injury/irritation

Name	Types	Numerical values
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Rabbit	No significant stimulation

Allergenic:**Skin sensitization**

Name	Types	Numerical values
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Rat	Unclassified

Respiratory allergy

Regarding the composition, there are currently no data or available data sufficient to perform classification.

Reproductive cell mutagenicity

Name	Exposure routes	Numerical values
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	In vitro	Non-mutagenic.

Carcinogenicity

Regarding the composition, there are currently no data or available data sufficient to perform classification.

Reproductive toxicity**Effects on reproduction and/or growth and development**

Name	Exposure routes	Numerical values	Types	Test Results	Exposure period
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Swallowing	Not classified as male reproductive	Rat	NOAEL 70 mg/kg/day	90 Heaven
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Swallowing	Not classified as female reproductive	Rat	NOAEL 70 mg/kg/day	From pre-reproductive period to lactation period
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Swallowing	Developmentally toxic	Rat	NOAEL 2 mg/kg/day	2 Generation

Target organ**Specific target organ toxicity – single exposure**

Regarding the composition, there are currently no data or available data sufficient to perform classification.

Specific target organ toxicity – repeated exposure

Name	Exposure routes	Target organ	Numerical values	Types	Test Results	Exposure period
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Swallowing	Endocrine System	Causes organ damage due to prolonged or repeated exposure.	Rat	NOAEL 2 mg/kg/day	126 Heaven
Tri-n-butylammonium bis(trifluoromethanesulfonate)imide salt	Swallowing	Liver Immune system Muscles Kidneys and/or bladder Hearing system Heart Skin Gastrointestinal tract Bones, teeth, nails and/or hair Hematopoietic system Nervous system Eyes Respiratory system Blood	Unclassified	Rat	NOAEL 70 mg/kg/day	90 Heaven

Piping System

Inhalation-hazardous substances

Regarding the composition, there are currently no data or available data sufficient to perform classification.

For other toxicological data regarding this material and/or its components, please contact the address or telephone number listed on the first page of the Safety Data Sheet.

12. Ecological Data

The information provided below may not align with the material classification specified in Section 2; however, if the classification of a particular component is authorized by the competent authority, other information pertaining to the material classification in Section 2 may be provided upon request. Additionally, environmental effects and impact data for specific components may not be reflected in this section, where the concentration of one component is below the required labeling value, or where such component may not pose an exposure risk, or where the relevant data may not be relevant to the overall material.

12.1. Ecotoxicity

Acute aquatic organism hazards:

GHS Acute Category 3: Harmful to aquatic life.

Chronic aquatic hazards:

GHS Category 3: Harmful to aquatic life with long-lasting effects.

No available product test data

Materials	CAS Number	Biological	Type	Exposure	Test endpoints	Test Results
Tri-n-butylammonium bis (trifluoromethanes ulfonate)imide salt	405514-94-5	Green algae	Experimental	72 Hours	Half-maximal effective concentration (EC ₅₀)	>100 mg/L
Tri-n-butylammonium bis (trifluoromethanes ulfonate)imide salt	405514-94-5	Daphnia	Experimental	48 Hours	Half-maximal effective concentration (EC ₅₀)	38 mg/L
Tri-n-butylammonium bis (trifluoromethanes ulfonate)imide salt	405514-94-5	Zebrafish	Experimental	96 Hours	LC50	>100 mg/L
Tri-n-butylammonium bis (trifluoromethanes ulfonate)imide salt	405514-94-5	Green algae	Experimental	72 Hours	NOEC	46 mg/L

12.2. Persistence and Biodegradability

Materials	CAS Number	Test Type	Period	Research Type	Test Results	Agreement
Tri-n-butylammonium bis (trifluoromethanes ulfonate)imide salt	405514-94-5	Biodegradation of the experiment	28 Heaven	Biochemical Oxygen Demand	3 %BOD/ThOD	OECD 301D – Closed Bottle Test

12.3. Bioaccumulative Potential

Materials	CAS Number	Test Type	Period	Research Type	Test Results	Agreement
Tri-n-butylammonium bis (trifluoromethanes ulfonate)imide salt	405514-94-5	Estimated bioaccumulation factor – Fish	56 Heaven	Bioaccumulation factor	<41	OECD305 – Bioaccumulation

12.4. Soil Mobility

For more detailed information, please contact the manufacturer.

12.5. Other Adverse Effects

No available data.

13. Disposal Methods

13.1. Waste Disposal Methods

Handle inner contents or containers in accordance with local, regional, national, or international regulations.

The treatment of waste products shall be carried out at licensed industrial waste treatment facilities. Where the waste products constitute discarded substitutes, they shall be incinerated in licensed waste incinerators. Appropriate destruction may require the use of additional fuel during the incineration process. The combustion products include hydrogen fluoride. The facility must be capable of handling halogenated substances. Unless otherwise specified by applicable waste management regulations, empty drums, barrels, or containers used for the transport and handling of hazardous chemicals (classified as hazardous chemicals, mixtures, or preparations under applicable regulations) shall be stored, disposed of, or treated as hazardous waste. Please consult the relevant authorities to determine available disposal and treatment facilities.

14. Shipping Documentation

14.1. International Regulations

Transportation does not pose any hazards.

United Nations Number:Not applicable

United Nations Transport Classification:Not applicable

Transportation Hazards Classification (IMO):Not Applicable

Transportation Hazards Classification (IATA):Not applicable

Packaging category:Not applicable

Marine pollutants (Yes/No):Not applicable

Special transportation methods and precautions:Not applicable

15. Regulatory Information

15.1. Regulations or Laws Specifically Governing the Safety, Health, and Environment of the Substance or Mixture.

Applicable Regulations:

Methods for the storage, removal, and treatment of industrial waste, and corresponding facility standards

Occupational Safety and Health Act

Labeling of Hazardous Chemicals and General Rules

15.2. Global Product Registration Status

Substances subject to registration under the Korean Chemical Substances Registration and Evaluation Act: 100–1,000 tons

Australia Chemicals List: No

Domestic material list for Canada: No

China's Current List of Chemical Substances (IECSC): Limited

Existing and newly identified chemical substances in Japan (ENCS): Exempt from chemical substance notification requirements

Current list of chemicals in South Korea: Yes

New Zealand. Hazardous Substances Control (NZIoC): No

Philippine List of Chemicals and Chemical Substances: No
Taiwan Existing Chemical Substances List: 3M Nominated
U.S. Toxic Substances Control Act: Currently in effect

16. Other Information

16.1. References

Watchmaking Unit

Name: Taiwan Minnesota Mining & Manufacturing Co., Ltd.
Address: 115018,3rd Floor, No.198 Jingmao 2nd Road, Nangang District, Taipei City
Phone: 886 3 4783600 ext 285

Watchmaker

Professional Title: Product Safety Engineer
Name: Wu Shangying

Watch manufacture date

2024/08/07

Version Information:

Section 1: Emergency Contact Numbers – Information has been deleted.
Section 9: Flammability (solid, gas) information – The information has been deleted.
Section 9: Flammability Information – Information has been added.
Section 9: Dynamic Viscosity Information – Information has been added.
Section 9: Odor – Data has been modified.
Section 9: Particle characteristics – Not applicable; information has been added.
Section 9: Viscosity – Information has been deleted.
Section 15: Global Product Registration Status – Data has been updated.
Section 1: Emergency Contact Numbers – Information has been added.

Disclaimer: The information contained in this Safety Data Sheet is based on our experience and is accurate as of the date of publication; however, we shall not be liable for any loss, injury, or damage arising from its use (except as otherwise provided by law). This data sheet does not apply to any other uses not mentioned herein, nor to any applications involving the combination of this product with other materials. For these reasons, it is highly recommended that customers conduct their own tests to ensure that the product is suitable for their specific application requirements.

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