SAFETY DATA SHEET

Section 1: PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product name</th>
<th>1,1,2,2-Tetrafluoroethanesulfonic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>352-14061,350-14062</td>
</tr>
<tr>
<td>CAS No</td>
<td>464-14-2</td>
</tr>
<tr>
<td>Formula</td>
<td>C2H2F4O3S</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>FUJIFILM Wako Pure Chemical Corporation</td>
</tr>
<tr>
<td></td>
<td>1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan</td>
</tr>
<tr>
<td></td>
<td>Phone: +81-6-6203-3741</td>
</tr>
<tr>
<td></td>
<td>Fax: +81-6-6203-5964</td>
</tr>
<tr>
<td>Supplier</td>
<td>FUJIFILM Wako Pure Chemical Corporation</td>
</tr>
<tr>
<td></td>
<td>1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan</td>
</tr>
<tr>
<td></td>
<td>Phone: +81-6-6203-3741</td>
</tr>
<tr>
<td></td>
<td>Fax: +81-6-6203-2029</td>
</tr>
<tr>
<td>Emergency telephone number</td>
<td>+81-6-6203-3741 / +81-3-3270-8571</td>
</tr>
<tr>
<td>Recommended uses and restrictions on use</td>
<td>For research purposes</td>
</tr>
<tr>
<td>Announcement of company name change</td>
<td>Company name has changed since April 1, 2018. Former name was &quot;Wako Pure Chemical Industries, Ltd.&quot;</td>
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</tbody>
</table>

Section 2: HAZARDS IDENTIFICATION

GHS classification
Classification of the substance or mixture
Acute toxicity - Oral Category 4
Acute toxicity - Dermal Category 4
Skin corrosion/irritation Category 1
Serious eye damage/eye irritation Category 1

Pictograms

Signal word Danger

Hazard statements
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H302 - Harmful if swallowed
H312 - Harmful in contact with skin

Precautionary statements-(Prevention)
Revision Date  21-Feb-2019

- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product
- Wear protective gloves/protective clothing/eye protection/face protection
- Do not breathe dust/fume/gas/mist/vapors/spray

Precautionary statements-(Response)
- 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
- Call a POISON CENTER or doctor/physician if you feel unwell.
- Wash contaminated clothing before reuse.
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
- Rinse mouth.
- Do NOT induce vomiting.

Precautionary statements-(Storage)
- Store locked up.

Precautionary statements-(Disposal)
- Dispose of contents/container to an approved waste disposal plant

Others
Other hazards  Not available

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance or Mixture  Substance

Formula  C2H2F4O3S

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Weight-%</th>
<th>Molecular weight</th>
<th>ENCS</th>
<th>ISHL No.</th>
<th>CAS No.</th>
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<tbody>
<tr>
<td>1,1,2,2-Tetrafluoroethane sulfonic Acid</td>
<td>97</td>
<td>182.09</td>
<td>N/A</td>
<td>N/A</td>
<td>464-14-2</td>
</tr>
</tbody>
</table>

Impurities and/or Additives  Not applicable

Section 4: FIRST AID MEASURES

Inhalation
Remove to fresh air. If symptoms persist, call a physician.

Skin contact
Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eye contact
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediate medical attention is required.

Ingestion
Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.
Do not induce vomiting without medical advice.

Protection of first-aiders
Use personal protective equipment as required.

Section 5: FIRE FIGHTING MEASURES

Suitable extinguishing media
Water spray (fog), Carbon dioxide (CO2), Foam, Extinguishing powder, Sand
Unsuitable extinguishing media  
No information available

Special extinguishing method  
No information available

Specific hazards arising from the chemical product  
Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Protection of fire-fighters  
Use personal protective equipment as required. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

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**Section 6: ACCIDENTAL RELEASE MEASURES**

Personal precautions, protective equipment and emergency procedures  
For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Environmental precautions  
To be careful not discharged to the environment without being properly handled waste water contaminated.

Methods and materials for contaminant and methods and materials for cleaning up  
Absorb dry sand, earth, sawdust and the waste. Collect empty container that can be sealed.

Recovery, neutralization  
No information available

Secondary disaster prevention measures  
Clean contaminated objects and areas thoroughly observing environmental regulations.

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**Section 7: HANDLING AND STORAGE**

Handling  
Technical measures  
Highly flammable. Avoid contact with high temperature objects, spark, and strong oxidizing agents. Use with local exhaust ventilation.

Precautions  
Do not rough handling containers, such as upsetting, falling, giving a shock, and dragging. Prevent leakage, overflow, and scattering. Not to generate steam and dust in vain. Seal the container after use. After handling, wash hands and face, and then gargle. In places other than those specified, should not be smoking or eating and drinking. Should not be brought contaminated protective equipment and gloves to rest stops. Deny unnecessary entry of non-emergency personnel to the handling area.

Safety handling precautions  
Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

Storage  
Safe storage conditions  
Storage conditions  
Keep container protect from light, store in well-ventilated place at room temperature (preferably cool). Keep container tightly closed.

Safe packaging material  
Glass

Incompatible substances  
Strong oxidizing agents

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**Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

Engineering controls  
In case of indoor workplace, seal the source or use a local exhaust system. Provide the safety shower facility, and hand- and eye-wash facility. And display their position clearly.

Exposure limits  
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Personal protective equipment

Respiratory protection: Protective mask
Hand protection: Impermeable protective gloves
Eye protection: protective eyeglasses or chemical safety goggles
Skin and body protection: Long-sleeved work clothes

General hygiene considerations
Handle in accordance with good industrial hygiene and safety practice.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Form</th>
<th>Color</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Colorless - pale yellowish brown</td>
</tr>
<tr>
<td>Appearance</td>
<td>liquid</td>
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<tr>
<td>Odor</td>
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</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point, initial boiling point and boiling range</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation rate:</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas): Upper/lower flammability or explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper :</td>
<td>No data available</td>
</tr>
<tr>
<td>Lower :</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour density</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific Gravity / Relative density</td>
<td>1.75 g/ml</td>
</tr>
<tr>
<td>Solubilities</td>
<td>No data available</td>
</tr>
<tr>
<td>n-Octanol/water partition coefficient:(log Pow)</td>
<td>No data available</td>
</tr>
<tr>
<td>Auto-ignition temperature:`</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature:</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity (coefficient of viscosity)</td>
<td>No data available</td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>No data available</td>
</tr>
</tbody>
</table>

Section 10: STABILITY AND REACTIVITY

Stability

Stability: May be altered by light.
Reactivity: No data available

Hazardous reactions
None under normal processing

Conditions to avoid
Extremes of temperature and direct sunlight, Heat, flames and sparks, static electricity, spark

Incompatible materials
Strong oxidizing agents

Hazardous decomposition products
Carbon monoxide (CO), Carbon dioxide (CO2), Sulfur oxides (SOx), Halides

Section 11: TOXICOLOGICAL INFORMATION

Acute toxicity
No data available
Skin irritation/corrosion: No data available
Serious eye damage/irritation: No data available
Respiratory or skin sensitization: No data available
Reproductive cell mutagenicity: No data available
Carcinogenicity: 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

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: No information available
Other data: No data available
Persistence and degradability: No information available
Bioaccumulative potential: No information available
Mobility in soil: No information available
Hazard to the ozone layer: No information available

Section 13: DISPOSAL CONSIDERATIONS

Waste from residues: Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated container and contaminated packaging: Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: TRANSPORT INFORMATION

ADR/RID
UN number: UN3265
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (1,1,2,2-Tetrafluoroethanesulfonic Acid)
UN classification: 8
Subsidiary hazard class: I
Packing group: Not applicable
Marine pollutant: Not applicable

IMDG
UN number: UN3265
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (1,1,2,2-Tetrafluoroethanesulfonic Acid)
UN classification: 8
Subsidiary hazard class: I
Packing group: Not applicable
Marine pollutant (Sea): Not applicable
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: No information available

IATA
UN number: UN3265
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (1,1,2,2-Tetrafluoroethanesulfonic Acid)
UN classification: 8
Subsidiary hazard class: I
Environmentally Hazardous Substance  Not applicable

Section 15: REGULATORY INFORMATION

International Inventories
- EINECS/ELINCS
- TSCA

Japanese regulations
- Fire Service Act: Category IV, Class III petroleums, dangerous grade 3
- Poisonous and Deleterious Substances Control Law: Not applicable
- Industrial Safety and Health Act Regulations for the carriage and storage of dangerous goods in ship: Corrosive Substances (Ordinance Art.3, Ministry of Transportation Ordinance Regarding Transport by Ship and Storage, Attached Table 1)
- Civil Aeronautics Law: Corrosive Substances (Ordinance Art.194, MITL Nortification for Air Transportation of Explosives etc., Attached Table 1)
- Pollutant Release and Transfer Register Law: Not applicable
- Export Trade Control Order: Not applicable

Section 16: OTHER INFORMATION

Key literature references and sources for data etc.
- IATA dangerous Goods Regulations
- RTECS:Registry of Toxic Effects of Chemical Substances
- Japan Industrial Safety and Health Association GHS Model SDS Dictionary of Synthetic Oraganic Chemistry , SSOCJ, Koudansha Scientific Co.Ltd.
- Chemical Dictionary, Kyouritsu Publishing Co., Ltd.
- etc

Disclaimer
The information provided in 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 guidance for safe handling, and is not to be considered 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 materials or in any process, unless specified in the text.
GHS Classification is according to JIS Z7252(2014). *JIS: Japanese Industrial Standards

Product information
You might get a product which indicates a former company name, during the period of transition.

End of Safety Data Sheet