SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
- Chemical Name: Sodium tetrasulfide (solution)
- Molecular formula: Na2S4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Uses of the Substance / Mixture
- Metallurgy.
- Purifying flue gas
- Soil and groundwater remediation
- Contact your supplier for additional information

1.3 Details of the supplier of the safety data sheet

Company
SOLVAY FLUORIDES, LLC
3333 RICHMOND AVENUE
77098-3099, HOUSTON
USA
Tel: +1-713-5256700
Fax: +1-713-5257805

Prepared by
Solvay Product Stewardship (see Telephone number above)

Date Prepared
04/02/2015

1.4 Emergency telephone

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC 800-424-9300 within the United States and Canada, or 703-527-3887 for international collect calls.

SECTION 2: Hazards Identification

2.1 Emergency overview

Appearance
- Form: slightly viscous liquid of low volatility
- Physical state: liquid
- Color: dark red dark red
- Odor: sulfurous

Warning statements
- Toxic if swallowed.
- Causes burns.
- Hazardous decomposition products formed under fire conditions.
- Health Hazard
- Hazardous to the aquatic environment - chronic hazard
- Corrosive
- Health Hazard
- Harmful by inhalation.

2.2 Potential Health Effects
Inhalation effect
- Irritating to mucous membranes
- Moderate respiratory irritant

Skin effect
- Causes skin burns.

Eye effect
- Risk of serious damage to eyes.
- May cause permanent eye injury.
- May cause blindness.

Ingestion effect
- Ingestion causes burns of the upper digestive and respiratory tracts.
- Ingestion may provoke the following symptoms:
  - Nausea
  - Vomiting
  - Abdominal pain
  - Diarrhea
  - Symptoms
  - Nausea
  - Abdominal pain
  - Vomiting
  - Diarrhea

Chronic effects
- This product does not contain any ingredient designated by IARC or ACGIH as probable or suspected human carcinogens.

SECTION 3: Composition/information on ingredients

3.1 Information on Components and Impurities

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identification number/ CAS-No.</th>
<th>Concentration [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium tetrasulfide [solution]</td>
<td>12034-39-8</td>
<td>30 - 34</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1 Description of first-aid measures

In case of inhalation
- In case of accident by inhalation: remove casualty to fresh air and keep at rest.
- Oxygen or artificial respiration if needed.
- Consult a physician.

Exposure to decomposition products
- If inhaled
- Remove to fresh air.
In case of skin contact
- Take off contaminated clothing and shoes immediately.
- Wash contaminated clothing before re-use.
- Call a physician immediately.
- Wash off immediately with soap and plenty of water.

In case of eye contact
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Consult with an ophthalmologist immediately in all cases.

In case of ingestion
- Call a physician immediately.
- Take victim immediately to hospital.
- If the victim is conscious:
  - If swallowed, rinse mouth with water (only if the person is conscious).
  - Do NOT induce vomiting.
- If the victim is unconscious:
  - Artificial respiration and/or oxygen may be necessary.

4.2 Most important symptoms and effects, both acute and delayed

In case of inhalation
Effects
- Irritating to mucous membranes
- Moderate respiratory irritant

In case of skin contact
Effects
- Causes skin burns.

In case of eye contact
Effects
- Risk of serious damage to eyes.
- May cause permanent eye injury.
- May cause blindness.

In case of ingestion
Symptoms
- Ingestion may provoke the following symptoms:
  - Nausea
  - Vomiting
  - Abdominal pain
  - Diarrhea

Effects
- Ingestion causes burns of the upper digestive and respiratory tracts.

4.3 Indication of any immediate medical attention and special treatment needed
- no data available
SECTION 5: Firefighting measures

Flash point
Not applicable

Autoignition temperature
no data available

Flammability / Explosive limit
no data available

5.1 Extinguishing media

Suitable extinguishing media
- powder
- Foam
- Aqueous film forming foam (AFFF).

Unsuitable extinguishing media
- Carbon dioxide (CO2)
- Water

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting
- Not combustible.
- Hazardous decomposition products

Hazardous combustion products:
- Sulphur dioxide
- Sulfur oxides
- Sodium oxides
- hydrogen sulfide

5.3 Advice for firefighters

Special protective equipment for fire-fighters
- Evacuate personnel to safe areas.
- Fire fighters must wear fire resistant personnel protective equipment.
- In the event of fire, wear self-contained breathing apparatus.
- Wear chemical resistant oversuit

Further information
- Keep product and empty container away from heat and sources of ignition.
- Control the use of water due to environmental risk (see section 6).

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel
- Prevent further leakage or spillage if safe to do so.
- Keep away from incompatible products

Advice for emergency responders
- Immediately evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.
- Wear self-contained breathing apparatus and protective suit.
- Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Suppress (knock down) gases/vapors/mists with a water spray jet.
- Avoid spraying the leak source.
- Ventilate the area.

6.2 Environmental precautions
- Do not flush into surface water or sanitary sewer system.
- If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and materials for containment and cleaning up
- Dam up.
- Soak up with inert absorbent material.
- Avoid dust formation.
- Keep in suitable, closed containers for disposal.
- Store in a place accessible by authorized persons only.
- Treat recovered material as described in the section "Disposal considerations".

6.4 Reference to other sections
- no data available

SECTION 7: Handling and storage

7.1 Precautions for safe handling
- Carry out all operations in closed piping circuits and equipment.
- Use only in well-ventilated areas.
- Keep away from incompatible products.
- Use only equipment and materials which are compatible with the product.

Hygiene measures
- Use only in an area equipped with a safety shower.
- When using do not eat, drink or smoke.
- Handle in accordance with good industrial hygiene and safety practice.
- Ensure that eyewash stations and safety showers are close to the workstation location.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions
- Keep away from incompatible products.
- Keep in a cool, well-ventilated place.
- Keep only in the original container.
- Keep container closed.
- Keep away from fire, sparks and heated surfaces.
- Provide tight electrical equipment well protected against corrosion.
- Refer to protective measures listed in sections 7 and 8.

Packaging material
Suitable material
- Plastic drum

7.3 Specific end use(s)
- Contact your supplier for additional information
SECTION 8: Exposure controls/personal protection

Introductory Remarks: These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

8.1 Control parameters

- Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Control measures

Engineering measures
- Provide local ventilation appropriate to the product decomposition risk (see section 10).
- Apply technical measures to comply with the occupational exposure limits.
- Refer to protective measures listed in sections 7 and 8.

Individual protection measures

Respiratory protection
- In case of insufficient ventilation, wear suitable respiratory equipment.
- Self-contained breathing apparatus in confined spaces/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.

Hand protection
- Protective gloves - impervious chemical resistant:
  Suitable material
  - PVC
  - Neoprene
  - Natural Rubber

Eye protection
- Chemical resistant goggles must be worn.
- Do not wear contact lenses.

Skin and body protection
- Long sleeved clothing
- Apron/boots of butyl rubber if risk of splashing.

Hygiene measures
- Use only in an area equipped with a safety shower.
- When using do not eat, drink or smoke.
- Handle in accordance with good industrial hygiene and safety practice.
- Ensure that eyewash stations and safety showers are close to the workstation location.
### SECTION 9: Physical and chemical properties

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product information phone number in Section 1 for its exact specifications.

#### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Form: slightly viscous liquid of low volatility</td>
</tr>
<tr>
<td></td>
<td>Physical state: liquid</td>
</tr>
<tr>
<td></td>
<td>Color: dark red</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>Sulfurous</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>12.9 (10 g/l) @ 68°F (20°C)</td>
</tr>
<tr>
<td><strong>Freezing point</strong></td>
<td>-29°F (-34°C)</td>
</tr>
<tr>
<td><strong>Boiling point/boiling range</strong></td>
<td>235°F (113°C)</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Evaporation rate (Butylacetate = 1)</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (liquids)</strong></td>
<td>The product is not flammable.</td>
</tr>
<tr>
<td><strong>Flammability / Explosive limit</strong></td>
<td>Explosiveness: See section 10.</td>
</tr>
<tr>
<td><strong>Autoignition temperature</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor pressure</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapor density</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Solubility</strong></td>
<td>Water solubility: completely miscible</td>
</tr>
<tr>
<td><strong>Partition coefficient: n-octanol/water</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Thermal decomposition</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Explosive properties</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Oxidizing properties</strong></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
9.2 Other information

Molecular weight 174.2 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity
- no data available

10.2 Chemical stability
- Stable under recommended storage conditions.
- Heating may cause an explosion.

10.3 Possibility of hazardous reactions
- no data available

10.4 Conditions to avoid
- Heat.

10.5 Incompatible materials
- Acids
- Oxidizing agents
- Carbon dioxide (CO2)
- Non iron metals (aluminum, magnesium, zinc, ...)

10.6 Hazardous decomposition products
- Sulphur dioxide
- Sulfur oxides
- Sodium oxides
- hydrogen sulfide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute oral toxicity LD50: 96 - 208 mg/kg - Rat
Test substance: Solid form

Acute inhalation toxicity LC50 - 18 min 1,500 mg/l

Acute dermal toxicity LD50 900 - 1,350 mg/kg - Rabbit

Acute toxicity (other routes of administration) no data available

Skin corrosion/irritation Corrosive

Serious eye damage/eye irritation Corrosive
**Respiratory or skin sensitization**  
no data available

**Mutagenicity**

- **Genotoxicity in vitro**  
no data available
- **Genotoxicity in vivo**  
no data available

**Carcinogenicity**  
no data available

This product does not contain any ingredient designated as probable or suspected human carcinogens by:
- IARC
- ACGIH

**Toxicity for reproduction and development**

- **Toxicity to reproduction / fertility**  
no data available
- **Developmental Toxicity/Teratogenicity**  
no data available

**STOT**

- **STOT-single exposure**  
no data available
- **STOT-repeated exposure**  
no data available
- **Aspiration toxicity**  
no data available

**Further information**

Toxic if swallowed.  
Corrosive effects linked to alkaline properties of the product  
Risk of effect on the nervous system and respiratory tract

**SECTION 12: Ecological information**

| 12.1 Toxicity |  
no data available |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12.2 Persistence and degradability</td>
<td></td>
</tr>
</tbody>
</table>
no data available |
| 12.3 Bioaccumulative potential |  
| **Bioconcentration factor (BCF)** | Not applicable |
| 12.4 Mobility in soil |  
no data available |
| 12.5 Results of PBT and vPvB assessment |  
no data available |
12.6 Other adverse effects

no data available

Remarks

Toxic to aquatic organisms., Product fate is highly dependent on environmental conditions: pH, temperature, redox potential, mineral and organic content of the medium, ...

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product Disposal

- In accordance with local and national regulations.
- Refer to manufacturer/supplier for information on recovery/recycling.

Advice on cleaning and disposal of packaging

- Containers that cannot be cleaned must be treated as waste.
- or
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.

SECTION 14: Transport information

Transportation status: IMPORTANT! Statements below provide additional data on listed transport classification.
The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

TDG

14.1 UN number

UN 3266

14.2 Proper shipping name

CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (Stannate salt)

14.3 Transport hazard class

8

Label(s)

8

14.4 Packing group

Packing group: II

ERG No: 154

14.5 Environmental hazards

Marine pollutant: NO

DOT

14.1 UN number

UN 3266

14.2 Proper shipping name

CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (Stannate salt)

14.3 Transport hazard class

8

Label(s)

8

14.4 Packing group

Packing group: II

ERG No: 154
14.5 Environmental hazards
Marine pollutant
NO

14.6 Special precautions for user
For personal protection see section 8.

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transportation regulations for hazardous materials, it would be advisable to check their validity with your sales office.
SECTION 15: Regulatory information

15.1 Notification status

<table>
<thead>
<tr>
<th>Inventory Information</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States TSCA Inventory</td>
<td>One or more components not listed on inventory</td>
</tr>
<tr>
<td>New Zealand. Inventory of Chemical Substances</td>
<td>In compliance with the inventory</td>
</tr>
<tr>
<td>Canadian Domestic Substances List (DSL)</td>
<td>One or more components not listed on inventory</td>
</tr>
<tr>
<td>Australia Inventory of Chemical Substances (AICS)</td>
<td>One or more components not listed on inventory</td>
</tr>
<tr>
<td>Japan. CSCL - Inventory of Existing and New Chemical Substances</td>
<td>One or more components not listed on inventory</td>
</tr>
<tr>
<td>Korea. Korean Existing Chemicals Inventory (KECI)</td>
<td>One or more components not listed on inventory</td>
</tr>
<tr>
<td>China. Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>One or more components not listed on inventory</td>
</tr>
<tr>
<td>Philippines Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>One or more components not listed on inventory</td>
</tr>
</tbody>
</table>

15.2 WHMIS (Workplace Hazardous Materials Information System) Classification

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Classification

D1A: Very Toxic Material Causing Immediate and Serious Toxic Effects
E: Corrosive Material

15.3 Other regulations

no data available

SECTION 16: Other information

NFPA (National Fire Protection Association) - Classification

Health 3 serious
Flammability 1 slight
Instability or Reactivity 1 slight
Special Notices None

HMIS (Hazardous Materials Identification System (Paint & Coating)) - Classification

Health 3 serious
Flammability 1 slight
Reactivity 1 slight
PPE Determined by User; dependent on local conditions
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. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose, and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.