1 Identification
Product identifier
Product name: Benzenesulfonyl chloride
Stock number: A10849, L03017
CAS Number: 98-09-9
EC number: 202-636-6

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

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com
Information Department: Health, Safety and Environmental Department
Emergency telephone number:
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification
Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

<table>
<thead>
<tr>
<th>GHS05 Corrosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Corr. 1B H314 Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td>Eye Dam. 1 H318 Causes serious eye damage.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GHS07</th>
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<tbody>
<tr>
<td>Acute Tox. 4 H302 Harmful if swallowed.</td>
</tr>
</tbody>
</table>

Hazard not otherwise classified: No information known.

Label elements
The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Signal word: Danger

Hazard statements
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P303+P361+P353 If on skin (or hair). Take off immediately all contaminated clothing. Rinse skin with water/shower. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification
D2B - Toxic material causing other toxic effects
E - Corrosive material

3 Composition/information on ingredients
Chemical characterization: Substances
CAS# Description: 98-09-9 Benzenesulfonyl chloride
Identification number(s):
EC number: 202-636-6

4 First-aid measures
Description of first aid measures
General information: Immediately remove any clothing soiled by the product.
### After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.

### After skin contact
Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.

### After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.

### After swallowing
Seek medical treatment.

### Information for doctor

**Most important symptoms and effects, both acute and delayed**
Causes severe skin burns. Causes serious eye damage.

**Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

### Fire-fighting measures

**Extinguishing media**
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**Suitable extinguishing agents**
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**Special hazards arising from the substance or mixture**
If this product is involved in a fire, the following can be released:
- Carbon monoxide and carbon dioxide
- Sulfur oxides (SOx)
- Hydrogen chloride (HCl)

**Advice for firefighters**
- **Protective equipment:**
  - Wear self-contained respirator.
  - Wear fully protective impervious suit.

### Accidental release measures

**Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation.

**Environmental precautions:**
Do not allow material to be released to the environment without proper governmental permits.

**Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Use neutralizing agent. Dispose of contaminated material as waste according to section 13. Ensure adequate ventilation.

**Prevention of secondary hazards:**
No special measures required.

**Reference to other sections**
See Section 7 for information on safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information.

### Handling and storage

**Handling**
Precautions for safe handling
Handle under dry protective gas. Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace.

**Information about protection against explosions and fires:**
No information known.

**Conditions for safe storage, including any incompatibilities**

**Storage**
Requirements to be met by storerooms and receptacles:
No special requirements.

**Information about storage in one common storage facility:**
Store away from oxidizing agents. Store away from strong bases. Store away from water/moisture.

**Further information about storage conditions:**
- Store under dry inert gas.
- This product is moisture sensitive. Keep container tightly sealed.
- Store in cool, dry conditions in well sealed containers. Protect from humidity and water.

**Specific end use(s)**
No further relevant information available.

### Exposure controls/personal protection

**Exposure controls**
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

**Personal protective equipment**
Use suitable respirator when high concentrations are present.

**General protective and hygienic measures**

**Wash hands before breaks and at the end of work.**
Avoid contact with the eyes and skin. Maintain an ergonomically appropriate working environment.

**Breathing equipment:**
Use suitable respirator when high concentrations are present.

**Protection of hands:**
Impervious gloves

**Eye protection:**
Tightly sealed goggles
9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance: Liquid
Form: Liquid
Color: Colorless
Odor: Irritating
Odor threshold: Not determined.

pH-value: Not determined.
Change in condition
Melting point/Melting range: 15-17 °C (59-63 °F)
Boiling point/Boiling range: 252 °C (486 °F)
Sublimation temperature / start: Not determined

Flash point: 132 °C (270 °F)
Flammability (solid, gaseous): Not determined.
Ignition temperature: 450 °C (842 °F)
Decomposition temperature: Not determined
Auto Igniting: Not determined.

Danger of explosion: Product does not present an explosion hazard.
Explosion limits:
Lower: Not determined
Upper: Not determined
Vapor pressure at 20 °C (68 °F): 0.09 hPa
Density at 20 °C (68 °F): 1.377 g/cm³ (11.491 lbs/gal)
Relative density: Not determined.
Vapor density: Not determined.
Evaporation rate: Not determined.
Partition coefficient (n-octanol/water): Not determined.
Solubility in / Miscibility with Water: Not miscible or difficult to mix
Viscosity: dynamic: Not determined.
kinematic: Not determined.

Other information No further relevant information available.

10 Stability and reactivity

Reactivity No information known.
Chemical stability: Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions No dangerous reactions known
Conditions to avoid No further relevant information available.
Incompatible materials:
Oxidizing agents
Bases
Water/moisture
 Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Sulfur oxides (SOx)
Hydrogen chloride (HCl)

11 Toxicological information

Information on toxicological effects

Acute toxicity:
Toxic if swallowed. Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
LD/LC50 values that are relevant for classification:
Oral LD50 1960 mg/kg (rat)

Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
Behavioral - somnolence (general depressed activity).
Behavioral - changes in motor activity (specific assay).
Lungs, Thorax, or Respiration - respiratory depression
Lungs, Thorax, or Respiration - dyspnea.
Sense Organs and Special Senses (Eye) - chromodacryorrhea.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes: Do not allow material to be released to the environment without proper governmental permits.
38.0.2 Do not allow undiluted product or large quantities to reach ground water, water course or sewage system. Avoid transfer into the environment.

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects No further relevant information available.

13 Disposal considerations
Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

<table>
<thead>
<tr>
<th>UN-Number</th>
<th>DOT, IMDG, IATA</th>
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| III |

Environmental hazards: Not applicable.

Special precautions for user
Warning: Corrosive substances

Segregation groups
Acids

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:
DOT
Marine Pollutant (DOT): No
UN "Model Regulation": UN2225, Benzene sulfonyl chloride, 8, III

15 Regulatory information
Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms
GHS05 GHS07

Signal word Danger
Hazard statements
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
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P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
SARA Section 313 (specific toxic chemical listings) Substance is not listed.
California Proposition 65
Prop 65 - Chemicals known to cause cancer Substance is not listed.
Prop 65 - Developmental toxicity Substance is not listed.
Prop 65 - Developmental toxicity, female Substance is not listed.
Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use:
For use only by technically qualified individuals.

This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.
Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.
Substance is not listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.
16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)