SAFETY DATA SHEET

Diethyl Sulfide

Version 1.5

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

Product information

Product Name: Diethyl Sulfide
Material: 1017947, 1024545, 1024826

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Legal Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl Sulfide</td>
<td>352-93-2</td>
<td>206-526-9</td>
<td>Chevron Phillips Chemicals International NV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>01-2119971585-25-0000</td>
</tr>
</tbody>
</table>

Company:
Chevron Phillips Chemical Company LP
Specialty Chemicals
10001 Six Pines Drive
The Woodlands, TX 77380

Local:
Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vinci lane 19
1831 Diegem
Belgium

SDS Requests: (800) 852-5530
Technical Information: (832) 813-4862
Responsible Party: Product Safety Group
Email: sds@cpchem.com

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)

Transport:
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)
Asia: +800 CHEMCALL (+800 2436 2255) China: +86-21-22157316
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
The substance is registered as an On-site isolated intermediate with Strictly Controlled Conditions (SCC) defined in Article 17(3) of Regulation EC No. 1907/2006 and must therefore be handled as such.

SECTION 2: Hazards identification

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Flammable liquids, Category 2
H225: Highly flammable liquid and vapor.

Eye irritation, Category 2
H319: Causes serious eye irritation.

Chronic aquatic toxicity, Category 3
H412: Harmful to aquatic life with long lasting effects.

Label elements
Labeling (REGULATION (EC) No 1272/2008)

<table>
<thead>
<tr>
<th>Hazard pictograms</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Flammable] ![Eye irritation]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Danger</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hazard Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>H225: Highly flammable liquid and vapor.</td>
</tr>
<tr>
<td>H319: Causes serious eye irritation.</td>
</tr>
<tr>
<td>H412: Harmful to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>

Precautionary Statements

Prevention:
- P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- P233 Keep container tightly closed.
- P240 Ground/bond container and receiving equipment.
- P243 Take precautionary measures against static discharge.
- P264 Wash hands thoroughly after handling.
- P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
- P303 + P361 + P353 IF ON SKIN (or hair): Remove/ 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.
- P337 + P313 If eye irritation persists: Get medical advice/
Diethyl Sulfide

SECTION 3: Composition/information on ingredients

Synonyms:
- Diethyl sulfide
- 1,1'-Thiobisethane
- DES
- 3-thiapentane
- Diethyl thioether
- Ethylthioethane

Molecular formula: C4H10S

Mixtures

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Classification</th>
<th>Concentration [wt%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl Sulfide</td>
<td>352-93-2 206-526-9</td>
<td>Flam. Liq. 2; H225 Eye Irrit. 2; H319 Aquatic Chronic 3; H412</td>
<td>97 - 100</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

General advice:
- Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled:
- Consult a physician after significant exposure. If unconscious place in recovery position and seek medical advice.

In case of skin contact:
- If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact:
- Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed:
- Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.
## SECTION 5: Firefighting measures

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>-10 to -4 °C (14 to 25 °F) at 100.4 kPa</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>189 to 199 °C (372 to 390 °F) at 101,45 to 102,39 kPa</td>
</tr>
<tr>
<td>Suitable extinguishing media</td>
<td>Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.</td>
</tr>
<tr>
<td>Unsuitable extinguishing media</td>
<td>High volume water jet.</td>
</tr>
<tr>
<td>Specific hazards during firefighting</td>
<td>Do not allow run-off from firefighting to enter drains or water courses.</td>
</tr>
<tr>
<td>Special protective equipment for firefighters</td>
<td>Wear self-contained breathing apparatus for firefighting if necessary.</td>
</tr>
<tr>
<td>Further information</td>
<td>Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.</td>
</tr>
<tr>
<td>Fire and explosion protection</td>
<td>Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Carbon oxides. Sulfur oxides.</td>
</tr>
</tbody>
</table>

## SECTION 6: Accidental release measures

<table>
<thead>
<tr>
<th>Precaution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal precautions</td>
<td>Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.</td>
</tr>
<tr>
<td>Environmental precautions</td>
<td>Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.</td>
</tr>
<tr>
<td>Methods for cleaning up</td>
<td>Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).</td>
</tr>
</tbody>
</table>

## SECTION 7: Handling and storage

### Handling
Diethyl Sulfide

Version 1.5

Revision Date 2016-06-07

Advice on safe handling: In case of an accident, this substance must be handled under Strictly Controlled Conditions (SCC) in accordance with REACH regulation Article 17(3) for on-site isolated intermediates. Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations. NORMS based Radon, a radioactive gas, may be present as a trace component in natural gas, natural gas liquids and petrochemicals derived from natural gas. Special precautions should be taken when entering or dismantling equipment in this type of service. Equipment should be checked externally while in service for gamma radiation above background levels. This equipment may contain internal surface deposits of radioactive radon decay products. Minimize unnecessary exposures to these radioactive deposits. Exposures can be reduced by allowing a 4 hour idle (no flow) period before entering or dismantling equipment. During this time the short lived decay products will decay. Longer lived radio nuclides (Pb-210, Bi-210 and Po-210) may be present. Avoid direct skin contact with deposits of radioactivity on surfaces. Avoid generation of dust, smoke or fumes in the work area or if they cannot be avoided, wear a tested and certified respirator for radioactive dusts. Smoking, eating and drinking should be prohibited when working with this equipment. Employees should wash thoroughly with soap and water and discard contaminated clothing after entering or handling equipment having radioactive deposits.

Advice on protection against fire and explosion: Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

Storage:
Requirements for storage areas and containers: No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Engineering measures:
The substance is registered as an On-site isolated intermediate with Strictly Controlled Conditions (SCC) defined in Article 17(3) of Regulation EC No. 1907/2006 and must therefore be handled as such. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits.
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**Personal protective equipment**

**Respiratory protection**: Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

**Hand protection**: The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

**Eye protection**: Eye wash bottle with pure water. Tightly fitting safety goggles.

**Skin and body protection**: Choose body protection according to the amount and concentration of the dangerous substance at the work place. Wear as appropriate: Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.

**Hygiene measures**: When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

The substance is registered as an On-site isolated intermediate with Strictly Controlled Conditions (SCC) defined in Article 17(3) of Regulation EC No. 1907/2006 and must therefore be handled as such.

**SECTION 9: Physical and chemical properties**

**Information on basic physical and chemical properties**

**Appearance**
- **Form**: Liquid
- **Physical state**: Liquid
- **Color**: Clear
- **Odor**: Pungent, garlic-like

**Safety data**
- **Flash point**: -10 - -4 °C (14 - 25 °F) at 100,4 kPa
### Diethyl Sulfide

**Lower explosion limit**: No data available

**Upper explosion limit**: No data available

**Oxidizing properties**: no

**Autoignition temperature**: 189 - 199 °C (372 - 390 °F) at 101,45 - 102,39 kPa

**Molecular formula**: C4H10S

**Molecular weight**: 90,2 g/mol

**pH**: No data available

**Pour point**: No data available

**Melting point/range**: -103,9 °C (-155,0 °F) at 103,25 hPa

**Boiling point/boiling range**: 92,1 °C (197,8 °F)

**Vapor pressure**: 10,00 kPa at 30,3 °C (86,5 °F)

**Density**: 0,84 g/cm³ at 20 °C (68 °F)

**Water solubility**: 3,07 g/l at 25 °C (77 °F)

**Partition coefficient: n-octanol/water**: log Pow: 1.95

**Solubility in other solvents**: Negligible

**Viscosity, dynamic**: 0,422 mPa.s at 20 °C (68 °F)

**Relative vapor density**: 3,1 (Air = 1.0)

**Evaporation rate**: No data available

**Percent volatile**: > 99 %

### SECTION 10: Stability and reactivity

**Chemical stability**: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

## Possibility of hazardous reactions

**SDS Number**: 100000014109 7/13
SAFETY DATA SHEET

Diethyl Sulfide

Version 1.5

Revision Date 2016-06-07

Conditions to avoid : Heat, flames and sparks.
Hazardous decomposition products : Carbon oxides
Sulfur oxides

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity
Diethyl Sulfide : LD50: > 5.000 mg/kg
Species: Rat
Sex: male and female
Method: OECD Test Guideline 401
Information given is based on data obtained from similar substances.

Acute inhalation toxicity
Diethyl Sulfide : LC50: 102 mg/l
Exposure time: 4 h
Species: Rat
Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403
Information given is based on data obtained from similar substances.

Skin irritation
Diethyl Sulfide : slight irritation. Information given is based on data obtained from similar substances.

Eye irritation
Diethyl Sulfide : Eye irritation
Information given is based on data obtained from similar substances.

Sensitization
Diethyl Sulfide : Does not cause skin sensitization.
Information given is based on data obtained from similar substances.

Repeated dose toxicity
Diethyl Sulfide : Species: Rat, male and female
Sex: male and female
Application Route: oral gavage
Dose: 0, 2.5, 25, 250 mg/kg/bw/d
Exposure time: 14 wk
Number of exposures: 7 d/wk
Method: OCED Guideline 408
No adverse effects expected
Information given is based on data obtained from similar substances.
Developmental Toxicity

Diethyl Sulfide
Species: Rat
Application Route: oral gavage
Dose: 100, 500, 1000 mg/kg/d
Exposure time: GD 6-19
Number of exposures: Daily
Test period: 20 d
Method: OECD Guideline 414
NOAEL Teratogenicity: 1.000 mg/kg
NOAEL Maternal: 1.000 mg/kg
No adverse effects expected
Information given is based on data obtained from similar substances.

Diethyl Sulfide
Aspiration toxicity
May be harmful if swallowed and enters airways.

CMR effects

Diethyl Sulfide
Carcinogenicity: Not available
Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Not available

Diethyl Sulfide
Further information
Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Concentrations substantially above the TLV value may cause narcotic effects. Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish

Diethyl Sulfide
LC50: > 49,8 mg/l
Exposure time: 96 h
Species: Danio rerio (Zebra Fish)
semi-static test Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

Diethyl Sulfide
EC50: 17 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
static test Information given is based on data obtained from similar substances.

Toxicity to algae

Diethyl Sulfide
EC50: 38 mg/l
Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (green algae)
Diethyl Sulfide

Method: OECD Test Guideline 201
Information given is based on data obtained from similar substances.

M-Factor
diethyl sulphide : 1

Toxicity to bacteria
Diethyl Sulfide : EC50: > 1.000 mg/l
Exposure time: 3 h
Respiration inhibition
Method: OECD Test Guideline 209

Biodegradability
Diethyl Sulfide : aerobic
Result: Not readily biodegradable.
41 %
Testing period: 28 d
Method: OECD Test Guideline 301D
Information given is based on data obtained from similar substances.

Ecotoxicology Assessment
Results of PBT assessment
Diethyl Sulfide : Non-classified PBT substance, Non-classified vPvB substance

Additional ecological information : Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.
Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product : Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging : Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).
Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous

SDS Number:100000014109 10/13
Diethyl Sulfide

Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN2375, DIETHYL SULFIDE, 3, II

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN2375, DIETHYL SULPHIDE, 3, II, (-10 - -4 °C)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2375, DIETHYL SULPHIDE, 3, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2375, DIETHYL SULPHIDE, 3, II, (D/E)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN2375, DIETHYL SULPHIDE, 3, II

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2375, DIETHYL SULPHIDE, 3, II

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

National legislation

Major Accident Hazard Legislation : 96/82/EC Update: 2003
Highly flammable
7b
Quantity 1: 5.000 t
Quantity 2: 50.000 t

Notification status
Europe REACH : On the inventory, or in compliance with the inventory
Notification number: 01-2119971585-25-000
United States of America TSCA : On the inventory, or in compliance with the inventory
Canada DSL : On the inventory, or in compliance with the inventory
Australia AICS : On the inventory, or in compliance with the inventory
New Zealand NZIoC : On the inventory, or in compliance with the inventory
Japan ENCS : Not in compliance with the inventory

SDS Number:100000014109 11/13
Diethyl Sulfide

SECTION 16: Other information

NFPA Classification
Health Hazard: 1
Fire Hazard: 3
Reactivity Hazard: 0

Further information
Legacy SDS Number: 46750

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

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, use, processing, storage, transportation, disposal and release 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.

<table>
<thead>
<tr>
<th>Key or legend to abbreviations and acronyms used in the safety data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
</tr>
<tr>
<td>AICS</td>
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<tr>
<td>DSL</td>
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<td>GHS</td>
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<tr>
<td>&gt;=</td>
</tr>
</tbody>
</table>
Diethyl Sulfide

<table>
<thead>
<tr>
<th>IC50</th>
<th>Inhibition Concentration 50%</th>
<th>SARA</th>
<th>Superfund Amendments and Reauthorization Act.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
<td>TSCA</td>
<td>Toxic Substance Control Act</td>
</tr>
<tr>
<td>KECI</td>
<td>Korea, Existing Chemical Inventory</td>
<td>UVCB</td>
<td>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Full text of H-Statements referred to under sections 2 and 3.

H225  Highly flammable liquid and vapor.
H319  Causes serious eye irritation.
H412  Harmful to aquatic life with long lasting effects.