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

Product information

Product Name: Di-tert-Butyl Polysulfide (TBPS 454)
Material: 1120381, 1072616, 1086440, 1086442, 1086441, 1024577, 1024572, 1024785, 1024784, 1024573, 1024574, 1024576, 1024578, 1024575, 1105172

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index No.</th>
<th>Legal Entity Registration number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Di-tert-butyl Polysulfide</td>
<td>68937-96-2</td>
<td>273-103-3</td>
<td></td>
<td>Chevron Phillips Chemicals International NV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01-2119540515-43-0001</td>
</tr>
</tbody>
</table>

Relevant Identified Uses

Supported: Manufacture
Use as an intermediate
Formulation
Lubricants - Industrial

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 Laan 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:
SAFETY DATA SHEET

Di-tert-Butyl Polysulfide (TBPS 454)

Version 1.12 Revision Date 2018-02-01

866.442.9628 (North America)
1.832.813.4984 (International)

Transport:
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)
Asia: CHEMWATCH (+61 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

Responsible Department: Product Safety and Toxicology Group
E-mail address: SDS@CPChem.com
Website: www.CPChem.com

SECTION 2: Hazards identification

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

Skin sensitization, Category 1  H317: May cause an allergic skin reaction.
Acute aquatic toxicity, Category 1  H400: Very toxic to aquatic life.
Chronic aquatic toxicity, Category 1  H410: Very toxic to aquatic life with long lasting effects.

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

Hazard pictograms: ![Warning] ![Sensitization]

Signal Word: Warning

Hazard Statements: H317 May cause an allergic skin reaction.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements: Prevention:
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P273 Avoid release to the environment.
P280 Wear protective gloves.
Response:
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P391 Collect spillage.

Hazardous ingredients which must be listed on the label:
- 68937-96-2 Di-tert-butyl Polysulfide
Di-tert-Butyl Polysulfide (TBPS 454)

SECTION 3: Composition/information on ingredients

Synonyms:
- Tertiary-Butyl Polysulfide
di-t-Butyl Polysulfide
tert-Butyl Polysulfide
Polysulfides, di-tert-Butyl
CPChem TBPS 454

Molecular formula:
C$_{8}$H$_{18}$S$_{x}$ (x = average of 4.0)

Mixtures

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration [wt%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Di-tert-butyl Polysulfide</td>
<td>68937-96-2</td>
<td>1272/2008</td>
<td>Skin Sens. 1B; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410</td>
<td>90 - 100</td>
</tr>
<tr>
<td></td>
<td>273-103-3</td>
<td></td>
<td></td>
<td></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.

If inhaled:
If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

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

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. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: Firefighting measures

Flash point:
103 °C (217 °F)
Method: ASTM D 93

Autoignition temperature:
225 °C (437 °F)
at 1.005,20 - 1.009,40 hPa
Information given is based on data obtained from similar substances.

Unsuitable extinguishing media:
High volume water jet.

SDS Number:100000014136
**Di-tert-Butyl Polysulfide (TBPS 454)**

**Version 1.12**

**Revision Date 2018-02-01**

<table>
<thead>
<tr>
<th>Specific hazards during fire fighting</th>
<th>Do not allow run-off from fire fighting to enter drains or water courses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special protective equipment for fire-fighters</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.</td>
</tr>
<tr>
<td>Fire and explosion protection</td>
<td>Normal measures for preventive fire protection.</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>Personal precautions</th>
<th>Use personal protective equipment.</th>
</tr>
</thead>
<tbody>
<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>Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.</td>
</tr>
<tr>
<td>For additional details, see the Exposure Scenario in the Annex portion</td>
<td></td>
</tr>
</tbody>
</table>

**SECTION 7: Handling and storage**

**Handling**

<table>
<thead>
<tr>
<th>Advice on safe handling</th>
<th>Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advice on protection against fire and explosion</td>
<td>Normal measures for preventive fire protection.</td>
</tr>
</tbody>
</table>

**Storage**

| Requirements for storage areas and containers | 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. Electrical installations / working materials must comply with the technological safety standards. |

SDS Number:100000014136

4/34
SECTION 8: Exposure controls/personal protection

Engineering measures
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 NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: 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. 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 in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.

Hygiene measures
- Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance
- Form: Liquid
- Physical state: Liquid
- Color: Yellow
- Odor: Mild, sweet
# Di-tert-Butyl Polysulfide (TBPS 454)

**SDS Number:** 100000014136

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash point</td>
<td>103 °C (217 °F)</td>
</tr>
<tr>
<td>Method</td>
<td>ASTM D 93</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>225 °C (437 °F) at 1,005,20 - 1,009,40 hPa</td>
</tr>
<tr>
<td></td>
<td>Information given is based on data obtained from similar substances.</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>144 °C</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>C8H18Sx (x = average of 4.0)</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>242.5 g/mol</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>-11 °C (12 °F) at 103.25 hPa</td>
</tr>
<tr>
<td></td>
<td>Information given is based on data obtained from similar substances.</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>172 - 180 °C (342 - 356 °F)</td>
</tr>
<tr>
<td></td>
<td>(5%-50%), Decomposes</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>15.60 Pa at 20 °C (68 °F)</td>
</tr>
<tr>
<td></td>
<td>Information given is based on data obtained from similar substances.</td>
</tr>
<tr>
<td>Density</td>
<td>1.0697 G/ML at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: 5.6</td>
</tr>
<tr>
<td></td>
<td>Information given is based on data obtained from similar substances.</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>Soluble in hexane and white spirits.</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>10 cP at 20 °C (68 °F)</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>1</td>
</tr>
</tbody>
</table>
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
Conditions to avoid: No data available.
Thermal decomposition: 144 °C
Hazardous decomposition products: Carbon oxides, Sulfur oxides
Other data: No decomposition if stored and applied as directed.

Section 11: Toxicological information

Acute oral toxicity
Di-tert-butyl Polysulfide: LD₅₀: > 2.000 mg/kg
Species: Rat
Sex: male and female
Method: OECD Test Guideline 401
Information given is based on data obtained from similar substances.

Acute dermal toxicity
Di-tert-butyl Polysulfide: LD₅₀: > 2.000 mg/kg
Sex: male and female
Method: OECD Test Guideline 402
Information given is based on data obtained from similar substances.

Skin irritation
Di-tert-butyl Polysulfide: Mild skin irritation

Eye irritation
Di-tert-butyl Polysulfide: Mild eye irritation
**SAFETY DATA SHEET**

**Di-tert-Butyl Polysulfide (TBPS 454)**

**Sensitization**

Di-tert-butyl Polysulfide: The product is a skin sensitizer, sub-category 1B.

**Repeated dose toxicity**

Di-tert-butyl Polysulfide: Species: Rat  
Application Route: Oral  
NOEL: 100 mg/kg  
Method: OECD Test Guideline 407  
Target Organs: Blood  
Information given is based on data obtained from similar substances.

**Reproductive toxicity**

Di-tert-butyl Polysulfide: Species: Rat  
Sex: male and female  
Application Route: Oral  
Method: OECD Guideline 421  
Fertility and developmental toxicity tests did not reveal any effect on reproduction.  
Information given is based on data obtained from similar substances.

**Di-tert-Butyl Polysulfide (TBPS 454)**

**Aspiration toxicity**: No aspiration toxicity classification.

**CMR effects**

Di-tert-butyl Polysulfide: Carcinogenicity: Not available  
Teratogenicity: Animal testing did not show any effects on fetal development.  
Reproductive toxicity: Animal testing did not show any effects on fertility.

**Di-tert-Butyl Polysulfide (TBPS 454)**

**Further information**: No data available.

**SECTION 12: Ecological information**

**Toxicity to fish**

Di-tert-butyl Polysulfide: LC50: > 0.088 mg/l  
Exposure time: 96 h  
static test Analytical monitoring: yes  
Method: OECD Test Guideline 203  
No toxicity at the limit of solubility.  
Information given is based on data obtained from similar substances.

**Toxicity to daphnia and other aquatic invertebrates**

Di-tert-butyl Polysulfide: EC50: 0.24 mg/l  
Exposure time: 48 h
Species: Daphnia magna (Water flea)  
static test Analytical monitoring: yes  
Method: OECD Test Guideline 202  
Information given is based on data obtained from similar substances.

**Toxicity to algae**

Di-tert-butyl Polysulfide:  
EC50: 0.838 mg/l  
Exposure time: 96 h  
Species: Pseudokirchneriella subcapitata (microalgae)  
static test Analytical monitoring: yes  
Method: OECD Test Guideline 201  
Information given is based on data obtained from similar substances.

**M-Factor**

Polysulfides, di-tert-Bu:  
M-Factor (Acute Aquat. Tox.) 1  
M-Factor (Chron. Aquat. Tox.) 1

**Toxicity to bacteria**

Di-tert-butyl Polysulfide:  
NOEC: 45.1 mg/l  
Respiration inhibition

**Biodegradability**

Di-tert-butyl Polysulfide:  
aerobic  
Result: Not readily biodegradable.  
13 %  
Testing period: 28 d  
Method: OECD Test Guideline 301B  
Information given is based on data obtained from similar substances.

**Ecotoxicology Assessment**

Acute aquatic toxicity  
Di-tert-butyl Polysulfide:  
Very toxic to aquatic life.

Chronic aquatic toxicity  
Di-tert-butyl Polysulfide:  
Very toxic to aquatic life with long lasting effects.

Results of PBT assessment:  
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Additional ecological information:  
Very toxic 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: The product should not be allowed to enter drains, water courses or the soil. 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.

For additional details, see the Exposure Scenario in the Annex portion

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 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)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DI-TERT-BUTYL POLYSULFIDE), 9, III

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DI-TERT-BUTYL POLYSULFIDE), 9, III, (103 °C), MARINE POLLUTANT, (DI-TERT-BUTYL POLYSULFIDE)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DI-TERT-BUTYL POLYSULFIDE), 9, III

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DI-TERT-BUTYL POLYSULFIDE), 9, III

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DI-TERT-BUTYL POLYSULFIDE), 9, III
ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (DI-TERT-BUTYL POLYSULFIDE), 9, III

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

SECTION 15: Regulatory information

National legislation
Chemical Safety Assessment

Ingredients : Polysulfides, di-tert-Bu 273-103-3

Major Accident Hazard Legislation
: 96/82/EC Update: 2003
   Dangerous for the environment 9a
   Quantity 1: 100 t
   Quantity 2: 200 t

   : ZEU_SEVES3 Update:
     ENVIRONMENTAL HAZARDS E1
     Quantity 1: 100 t
     Quantity 2: 200 t

Water contaminating class (Germany) : WGK 2 water endangering
Classification according to appendix 3

Notification status
Europe REACH : On the inventory, or in compliance with the inventory
Switzerland CH INV : On the inventory, or in compliance with the inventory
United States of America (USA) 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 : Not in compliance with the inventory
Japan ENCS : Not in compliance with the inventory
Korea KECI : On the inventory, or in compliance with the inventory
Philippines PICCS : On the inventory, or in compliance with the inventory
China IECSC : On the inventory, or in compliance with the inventory
SECTION 16: Other information

**NFPA Classification**: Health Hazard: 2  
Fire Hazard: 1  
Reactivity Hazard: 0

**Further information**

Legacy SDS Number: 627080

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>
</tr>
<tr>
<td>DSL</td>
</tr>
<tr>
<td>NDSL</td>
</tr>
<tr>
<td>CNS</td>
</tr>
<tr>
<td>CAS</td>
</tr>
<tr>
<td>EC50</td>
</tr>
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<td>EGEST</td>
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<td>EINECS</td>
</tr>
<tr>
<td>MAK</td>
</tr>
<tr>
<td>GHS</td>
</tr>
<tr>
<td>&gt;=</td>
</tr>
<tr>
<td>IC50</td>
</tr>
<tr>
<td>IARC</td>
</tr>
<tr>
<td>IECSC</td>
</tr>
<tr>
<td>ENCS</td>
</tr>
</tbody>
</table>
Di-tert-Butyl Polysulfide (TBPS 454)

New Chemical Substances

<table>
<thead>
<tr>
<th>KECI</th>
<th>Korea, Existing Chemical Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UVCB</th>
<th>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
</tr>
</tbody>
</table>

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

H317 May cause an allergic skin reaction.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.
### Annex

1. **Short title of Exposure Scenario:** Manufacture

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process category</td>
<td>PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
</tr>
<tr>
<td>Environmental release category</td>
<td>ERC1: Manufacture of substances</td>
</tr>
<tr>
<td>Further information</td>
<td>not determined</td>
</tr>
</tbody>
</table>

2. **Contribution scenario controlling environmental exposure for: ERC1: Manufacture of substances**

#### Amount used

| Annual amount per site | 900 tonnes/year |

#### Environment factors not influenced by risk management

| Flow rate | 390,000 m³/d |

#### Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Initial release factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of emission days per year</td>
</tr>
<tr>
<td>Emission or Release Factor: Air</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
</tr>
<tr>
<td>Final release factor</td>
</tr>
<tr>
<td>Emission or Release Factor: Air</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
</tr>
<tr>
<td>Local release rate: Water</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
</tbody>
</table>

| Local release rate: Air | 0,051 kg/day |
| Remarks | There is no direct release of the substance to air, as air emission abatement equipment such as an incinerator is used at the manufacturing site. Therefore, the release estimate and exposure calculations reported here only relate to/are treated as releases from the waste treated process. |
Di-tert-Butyl Polysulfide (TBPS 454)

Local release rate: Soil

Remarks: There is no direct exposure to soil.

### Technical conditions and measures / Organizational measures

<table>
<thead>
<tr>
<th>Medium</th>
<th>Release fraction to {medium} from incineration (Effectiveness:</th>
<th>%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Release fraction to air from incineration (Effectiveness: 0,01</td>
<td>0,01 %)</td>
</tr>
<tr>
<td>Water</td>
<td>Release fraction to water from incineration (Effectiveness: 0,01</td>
<td>0,01 %)</td>
</tr>
</tbody>
</table>

### Conditions and measures related to municipal sewage treatment plant

<table>
<thead>
<tr>
<th>Type of Sewage Treatment Plant</th>
<th>Effluent</th>
<th>Effectiveness (of a measure)</th>
<th>Sludge Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal sewage treatment plant</td>
<td>1.000 m³/d</td>
<td>91,56 %</td>
<td>Agricultural soil, Not applicable</td>
</tr>
</tbody>
</table>

### Conditions and measures related to external treatment of waste for disposal

<table>
<thead>
<tr>
<th>Waste treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.</td>
</tr>
</tbody>
</table>

### Conditions and measures related to external recovery of waste

<table>
<thead>
<tr>
<th>Recovery Methods</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Releases to waste (Effectiveness: 3 %)</td>
<td>Low risk assumed for waste life stage.</td>
</tr>
</tbody>
</table>

### 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor pressure</td>
<td>&lt; 0,5 kPa</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>&lt;= 50 °C</td>
</tr>
</tbody>
</table>

### Frequency and duration of use

| Exposure duration | < 8 h |

### Human factors not influenced by risk management

| Exposed skin area | One hand face only (240 cm²) |

### Other operational conditions affecting workers exposure

| Indoor |

### Technical conditions and measures

| Closed system (minimal contact during routine operations) |
| Local exhaust ventilation- inhalation: No (Effectiveness: 0 %) |

### Conditions and measures related to personal protection, hygiene and health evaluation

| Dermal Protection | Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %) |

### 2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

| Physical Form (at time of use) | Liquid substance |

SDS Number: 100000014136
### Di-tert-Butyl Polysulfide (TBPS 454)

**Version 1.12**

**Revision Date**: 2018-02-01

**Vapor pressure**: < 0.5 kPa

**Process Temperature**: <= 50 °C

**Frequency and duration of use**

**Exposure duration**: < 8 h

**Human factors not influenced by risk management**

**Exposed skin area**: Palms of both hands (480 cm²)

**Other operational conditions affecting workers exposure**

**Outdoor / Indoor**: Indoor

**Remarks**: Basic general ventilation (1-3 air changes per hour)

**Technical conditions and measures**

Closed continuous process with occasional controlled exposure

Local exhaust ventilation - inhalation: Yes (Effectiveness: 90 %)

Local exhaust ventilation - dermal: No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**

Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)

Respiratory Protection, No (Effectiveness: 0 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

**Product characteristics**

**Physical Form (at time of use)**: Liquid substance

**Vapor pressure**: < 0.5 kPa

**Process Temperature**: <= 50 °C

**Frequency and duration of use**

**Exposure duration**: < 8 h

**Human factors not influenced by risk management**

**Exposed skin area**: One hand face only (240 cm²)

**Other operational conditions affecting workers exposure**

**Outdoor / Indoor**: Indoor

**Remarks**: Basic general ventilation (1-3 air changes per hour)

**Technical conditions and measures**

Closed batch process with occasional controlled exposure.

Local exhaust ventilation - inhalation: Yes (Effectiveness: 90 %)

Local exhaust ventilation - dermal: No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**

Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)

Respiratory Protection, No (Effectiveness: 0 %)
### 2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form (at time of use)</td>
<td>Liquid substance</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>&lt; 0.5 kPa</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure duration</td>
<td>&lt; 8 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human factors not influenced by risk management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed skin area</td>
<td>Two hands (960 cm²)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor / Indoor</td>
<td>Indoor</td>
</tr>
<tr>
<td>Remarks</td>
<td>Good general ventilation (3-5 air changes per hour)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical conditions and measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Containment measures, No</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation- inhalation:, Yes (Effectiveness: 90 %)</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation-dermal:, No (Effectiveness: 0 %)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)</td>
<td></td>
</tr>
<tr>
<td>Respiratory Protection, No (Effectiveness: 0 %)</td>
<td></td>
</tr>
</tbody>
</table>

### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form (at time of use)</td>
<td>Liquid substance</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>&lt; 0.5 kPa</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>&lt;= 40 °C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure duration</td>
<td>&lt; 8 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human factors not influenced by risk management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed skin area</td>
<td>Two hands (960 cm²)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor / Indoor</td>
<td>Indoor</td>
</tr>
<tr>
<td>Remarks</td>
<td>Basic general ventilation (1-3 air changes per hour)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical conditions and measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-closed process with occasional controlled exposure</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation- inhalation:, Yes (Effectiveness: 95 %)</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation-dermal:, No (Effectiveness: 0 %)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
<th></th>
</tr>
</thead>
</table>
Di-tert-Butyl Polysulfide (TBPS 454)

Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)

Respiratory Protection, No (Effectiveness: 0 %)

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC1</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>Freshwater</td>
<td>0,000011 mg/L</td>
<td>0,045</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>Freshwater sediment</td>
<td>0,0041 mg/kg dry weight (d.w.)</td>
<td>0,0025</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>Marine water</td>
<td>0,0000043 mg/L</td>
<td>0,18</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>Marine sediment</td>
<td>0,0016 mg/kg dry weight (d.w.)</td>
<td>0,0097</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural soil</td>
<td>Agricultural soil</td>
<td>0,00004 mg/kg dry weight (d.w.)</td>
<td>0,022</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewage treatment plant</td>
<td>Sewage treatment plant</td>
<td>0,00043 mg/L</td>
<td>0,000095</td>
<td></td>
</tr>
</tbody>
</table>

ERC1: Manufacture of substances

Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,114 mg/m3</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,002 mg/kg bw/day</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>&lt; 0,01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC2, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1,144 mg/m3</td>
<td>0,079</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,068 mg/kg bw/day</td>
<td>0,021</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,099</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC3, CS15, CS37</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>3,432 mg/m3</td>
<td>0,237</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,034 mg/kg bw/day</td>
<td>0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,247</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8a, CS22, CS63, CS82</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>8,007 mg/m3</td>
<td>0,552</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,686 mg/kg bw/day</td>
<td>0,206</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,758</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS22, CS63, CS81</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>2,86 mg/m3</td>
<td>0,197</td>
<td></td>
</tr>
</tbody>
</table>

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| Worker – dermal, long-term – systemic | 0.686 mg/kg bw/day | 0.206 |
| Worker – long-term – systemic Combined routes | | 0.403 |

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)

PROC3: Use in closed batch process (synthesis or formulation)
CS15: General exposures (closed systems)
CS37: Use in contained batch processes

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS22: Transfer from/pouring from containers
CS63: Vessel / container
CS82: Non-dedicated facility

PROC8b: Transfer of substance or preparation (charging/ discharging) from/to vessels/ large containers at dedicated facilities
CS22: Transfer from/pouring from containers
CS63: Vessel / container
CS81: Dedicated facility

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

1. Short title of Exposure Scenario: Use as an intermediate

Main User Groups: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use: SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category: PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Environmental release category: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
Further information: not determined

SDS Number:100000014136 19/34
2.1 Contributing scenario controlling environmental exposure for: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Amount used
Annual amount per site : 800 tonnes/year

Environment factors not influenced by risk management
Flow rate : 390,000 m³/d

Other given operational conditions affecting environmental exposure
Initial release factor
Number of emission days per year : 300
Emission or Release Factor: Air : 0,0005 %
Emission or Release Factor: Water : 0,0005 %
Final release factor
Emission or Release Factor: Air : 0,0005 %
Emission or Release Factor: Water : 0,0005 %
Emission or Release Factor: Soil : 0 %
Local release rate: Water : 0,013 kg/day
Remarks : There is no direct release of the substance to waste water. Equipment cleaning water containing the substance is collected as waste for incineration. Therefore, the release estimate and exposure calculations reported here only relate to the waste treatment process.

Local release rate: Air : 0,013 kg/day
Remarks : There is no direct release of the substance to air, as air emission abatement equipment such as an incinerator is used at the manufacturing site. Therefore, the release estimate and exposure calculations reported here only relate to/are treated as releases from the waste treated process.

Local release rate: Soil :
Remarks : There is no direct exposure to soil.

Technical conditions and measures / Organizational measures
Air : Release fraction to air from incineration (Effectiveness: 0,01 %)
Water : Release fraction to water from incineration (Effectiveness: 0,01 %)

Conditions and measures related to municipal sewage treatment plant
Type of Sewage Treatment Plant : Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 1,000 m³/d
Effectiveness (of a measure) : 91,56 %
Sludge Treatment : Agricultural soil, Not applicable

Conditions and measures related to external treatment of waste for disposal
Waste treatment : No
Remarks : ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.

Conditions and measures related to external recovery of waste
Recovery Methods : Releases to waste (Effectiveness: 5 %)
### 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

#### Product characteristics
- **Physical Form (at time of use)**: Liquid substance
- **Vapor pressure**: $< 0.5 \text{kPa}$
- **Process Temperature**: $\leq 40 \, ^\circ\text{C}$

#### Frequency and duration of use
- **Exposure duration**: $< 8 \, \text{h}$

#### Human factors not influenced by risk management
- **Exposed skin area**: One hand face only (240 cm$^2$)

#### Other operational conditions affecting workers exposure
- **Outdoor / Indoor**: Indoor
- **Remarks**: Basic general ventilation (1-3 air changes per hour)

#### Technical conditions and measures
- **Closed system (minimal contact during routine operations)**
- **Local exhaust ventilation- inhalation**: No (Effectiveness: 0 %)
- **Local exhaust ventilation- dermal**: No (Effectiveness: 0 %)

#### Conditions and measures related to personal protection, hygiene and health evaluation
- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 90 %)
- **Respiratory Protection**: No (Effectiveness: 0 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

#### Product characteristics
- **Physical Form (at time of use)**: Liquid substance
- **Vapor pressure**: $< 0.5 \text{kPa}$
- **Process Temperature**: $\leq 40 \, ^\circ\text{C}$

#### Frequency and duration of use
- **Exposure duration**: $< 8 \, \text{h}$

#### Human factors not influenced by risk management
- **Exposed skin area**: Palms of both hands (480 cm$^2$)

#### Other operational conditions affecting workers exposure
- **Outdoor / Indoor**: Indoor
- **Remarks**: Basic general ventilation (1-3 air changes per hour)

#### Technical conditions and measures
- **Closed continuous process with occasional controlled exposure**
- **Local exhaust ventilation- inhalation**: Yes (Effectiveness: 90 %)
- **Local exhaust ventilation- dermal**: No (Effectiveness: 0 %)

#### Conditions and measures related to personal protection, hygiene and health evaluation
- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 90 %)
- **Respiratory Protection**: No (Effectiveness: 0 %)
# Di-tert-Butyl Polysulfide (TBPS 454)

## 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Vapor pressure:** $< 0.5 \text{ kPa}$
- **Process Temperature:** $\leq 40 ^\circ \text{C}$

### Frequency and duration of use
- **Exposure duration:** $< 8 \text{ h}$

### Human factors not influenced by risk management
- **Exposed skin area:** One hand face only (240 cm$^2$)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor:** Indoor
- **Remarks:** Basic general ventilation (1-3 air changes per hour)

### Technical conditions and measures
- **Closed continuous process with occasional controlled exposure**
- **Local exhaust ventilation - inhalation:** Yes (Effectiveness: 90 %)
- **Local exhaust ventilation - dermal:** No (Effectiveness: 0 %)

### Conditions and measures related to personal protection, hygiene and health evaluation
- **Dermal Protection:** Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 90 %)
- **Respiratory Protection:** No (Effectiveness: 0 %)

## 2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Vapor pressure:** $< 0.5 \text{ kPa}$
- **Process Temperature:** $\leq 40 ^\circ \text{C}$

### Frequency and duration of use
- **Exposure duration:** $< 8 \text{ h}$

### Human factors not influenced by risk management
- **Exposed skin area:** Two hands (960 cm$^2$)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor:** Indoor
- **Remarks:** Good general ventilation (3-5 air changes per hour)

### Technical conditions and measures
- **Containment measures:** None
- **Local exhaust ventilation - inhalation:** Yes (Effectiveness: 90 %)
- **Local exhaust ventilation - dermal:** No (Effectiveness: 0 %)

### Conditions and measures related to personal protection, hygiene and health evaluation
Di-tert-Butyl Polysulfide (TBPS 454)

Version 1.12
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Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)
Respiratory Protection, No (Effectiveness: 0 %)

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Physical Form (at time of use) : Liquid substance
Vapor pressure : < 0.5 kPa

Frequency and duration of use
Exposure duration : < 8 h

Human factors not influenced by risk management
Exposed skin area : Two hands (960 cm2)

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor
Remarks : Basic general ventilation (1-3 air changes per hour)

Technical conditions and measures
Semi-closed process with occasional controlled exposure
Local exhaust ventilation- inhalation: Yes (Effectiveness: 95 %)
Local exhaust ventilation-dermal: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)
Respiratory Protection, No (Effectiveness: 0 %)

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC6a</td>
<td>EUSES</td>
<td>Freshwater</td>
<td></td>
<td></td>
<td>0,0000029 mg/L</td>
<td>0,012</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td></td>
<td></td>
<td>0,0011 mg/kg dry weight (d.w.)</td>
<td>0,00066</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td></td>
<td></td>
<td>0,0000011 mg/L</td>
<td>0,047</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td></td>
<td>0,00043 mg/kg dry weight (d.w.)</td>
<td>0,0026</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural soil</td>
<td></td>
<td></td>
<td>0,000059 mg/kg dry weight (d.w.)</td>
<td>0,032</td>
<td></td>
</tr>
</tbody>
</table>

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Workers/Consumers

SDS Number: 100000014136 23/34
## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

SDS Number:100000014136 24/34
# SAFETY DATA SHEET

## Di-tert-Butyl Polysulfide (TBPS 454)

**Version 1.12**

**Revision Date** 2018-02-01

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### 1. Short title of Exposure Scenario: Formulation

- **Main User Groups**: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
- **Sector of use**: SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
- **Process category**
  - PROC1: Use in closed process, no likelihood of exposure
  - PROC2: Use in closed, continuous process with occasional controlled exposure
  - PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
  - PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
  - PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
  - PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

- **Environmental release category**: ERC2: Formulation of preparations

- **Further information**: not determined

### 2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

**Amount used**

- **Annual amount per site**: 20 tonnes/year
- **(Msafe)**: 0.29 tonnes/day

**Environment factors not influenced by risk management**

- **Flow rate**: 390,000 m³/d

**Other given operational conditions affecting environmental exposure**

- **Initial release factor**
  - Number of emission days per year: 100
  - Emission or Release Factor: Air: 0.1 %
  - Emission or Release Factor: Water: 0.1 %

- **Final release factor**
  - Emission or Release Factor: Air: 0.1 %
  - Emission or Release Factor: Water: 0.1 %
  - Emission or Release Factor: Soil: 0 %

- **Local release rate: Water**: 0.2 kg/day
  - Remarks: There is no direct release of the substance to waste water. Equipment cleaning water containing the substance is collected as waste for incineration. Therefore, the release estimate and exposure calculations reported here only relate to the waste treatment process.

- **Local release rate: Air**: 0.2 kg/day
  - Remarks: There is no direct release of the substance to air, as air emission abatement equipment such as an incinerator is used at the manufacturing site. Therefore, the release estimate and
### SAFETY DATA SHEET

**Di-tert-Butyl Polysulfide (TBPS 454)**

**Version 1.12**

<table>
<thead>
<tr>
<th>Local release rate: Soil</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>There is no direct exposure to soil.</td>
</tr>
</tbody>
</table>

**Conditions and measures related to municipal sewage treatment plant**

<table>
<thead>
<tr>
<th>Type of Sewage Treatment Plant</th>
<th>Flow rate of sewage treatment plant effluent</th>
<th>Effectiveness (of a measure)</th>
<th>Sludge Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal sewage treatment plant</td>
<td>1.000 m³/d</td>
<td>91,56 %</td>
<td>Agricultural soil, Not applicable</td>
</tr>
</tbody>
</table>

**Remarks**

There is no direct exposure to soil.

**Conditions and measures related to external treatment of waste for disposal**

<table>
<thead>
<tr>
<th>Waste treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.</td>
</tr>
</tbody>
</table>

**2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure**

**Product characteristics**

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Vapor pressure</th>
<th>Process Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid substance</td>
<td>&lt; 0.5 kPa</td>
<td>&lt;= 40 °C</td>
</tr>
</tbody>
</table>

**Frequency and duration of use**

<table>
<thead>
<tr>
<th>Exposure duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 8 h</td>
</tr>
</tbody>
</table>

**Human factors not influenced by risk management**

<table>
<thead>
<tr>
<th>Exposed skin area</th>
</tr>
</thead>
<tbody>
<tr>
<td>One hand face only (240 cm²)</td>
</tr>
</tbody>
</table>

**Other operational conditions affecting workers exposure**

<table>
<thead>
<tr>
<th>Outdoor / Indoor</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor</td>
<td>Basic general ventilation (1-3 air changes per hour)</td>
</tr>
</tbody>
</table>

**Technical conditions and measures**

Closed system (minimal contact during routine operations)
Local exhaust ventilation- inhalation:, No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**

Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 90 %)
Respiratory Protection, No (Effectiveness: 0 %)

**2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure**

**Product characteristics**

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Vapor pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid substance</td>
<td>&lt; 0.5 kPa</td>
</tr>
</tbody>
</table>

SDS Number:100000014136
Di-tert-Butyl Polysulfide (TBPS 454)

Process Temperature: <= 40 °C

Frequency and duration of use
Exposure duration: < 8 h

Human factors not influenced by risk management
Exposed skin area: Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure
Outdoor / Indoor: Indoor
Remarks: Basic general ventilation (1-3 air changes per hour)

Technical conditions and measures
Closed continuous process with occasional controlled exposure
Local exhaust ventilation - inhalation: Yes (Effectiveness: 90 %)
Local exhaust ventilation - dermal: No

Conditions and measures related to personal protection, hygiene and health evaluation
Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 90 %)
Respiratory Protection: No (Effectiveness: 0 %)

2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Physical Form (at time of use): Liquid substance
Vapor pressure: < 0.5 kPa
Process Temperature: <= 40 °C

Frequency and duration of use
Exposure duration: < 8 h

Human factors not influenced by risk management
Exposed skin area: Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure
Outdoor / Indoor: Indoor
Remarks: Basic general ventilation (1-3 air changes per hour)

Technical conditions and measures
Semi-closed process with occasional controlled exposure
Local exhaust ventilation - inhalation: Yes (Effectiveness: 90 %)
Local exhaust ventilation - dermal: No

Conditions and measures related to personal protection, hygiene and health evaluation
Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 90 %)
Respiratory Protection: No (Effectiveness: 0 %)

2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
## Di-tert-Butyl Polysulfide (TBPS 454)

### Product characteristics

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor pressure</td>
<td>&lt; 0.5 kPa</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>&lt;= 40 °C</td>
</tr>
</tbody>
</table>

### Frequency and duration of use

Exposure duration: < 8 h

### Human factors not influenced by risk management

Exposed skin area: Palms of both hands (480 cm²)

### Other operational conditions affecting workers exposure

**Outdoor / Indoor**: Indoor  
**Remarks**: Basic general ventilation (1-3 air changes per hour)

### Technical conditions and measures

- **Containment measures, None**
- **Local exhaust ventilation- inhalation**: Yes (Effectiveness: 90 %)
- **Local exhaust ventilation- dermal**: No

### Conditions and measures related to personal protection, hygiene and health evaluation

- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 90 %)  
- **Respiratory Protection**: No (Effectiveness: 0 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor pressure</td>
<td>&lt; 0.5 kPa</td>
</tr>
<tr>
<td>Process Temperature</td>
<td>&lt;= 40 °C</td>
</tr>
</tbody>
</table>

### Frequency and duration of use

Exposure duration: < 8 h

### Human factors not influenced by risk management

Exposed skin area: Palms of both hands (480 cm²)

### Other operational conditions affecting workers exposure

**Outdoor / Indoor**: Indoor  
**Remarks**: Basic general ventilation (1-3 air changes per hour)

### Technical conditions and measures

- **Semi-closed process with occasional controlled exposure**
- **Local exhaust ventilation- inhalation**: Yes (Effectiveness: 90 %)
- **Local exhaust ventilation- dermal**: No (Effectiveness: 0 %)

### Conditions and measures related to personal protection, hygiene and health evaluation

- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 90 %)  
- **Respiratory Protection**: No (Effectiveness: 0 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of
Di-tert-Butyl Polysulfide (TBPS 454)

Substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
- Physical Form (at time of use): Liquid substance
- Vapor pressure: < 0.5 kPa
- Process Temperature: <= 40 °C

Frequency and duration of use
- Exposure duration: < 8 h

Human factors not influenced by risk management
- Exposed skin area: Two hands (960 cm²)

Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Basic general ventilation (1-3 air changes per hour)

Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: Yes (Effectiveness: 95 %)
- Local exhaust ventilation - dermal: No

Conditions and measures related to personal protection, hygiene and health evaluation
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 90 %)
- Respiratory Protection: No (Effectiveness: 0 %)

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC2</td>
<td>EUSES</td>
<td>Freshwater</td>
<td></td>
<td></td>
<td></td>
<td>0.000042 mg/L</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td></td>
<td></td>
<td></td>
<td>0.016 mg/kg dry weight (d.w.)</td>
<td>0.0095</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td></td>
<td></td>
<td></td>
<td>0.000017 mg/L</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td></td>
<td></td>
<td>0.0064 mg/kg dry weight (d.w.)</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural soil</td>
<td></td>
<td></td>
<td></td>
<td>0.00029 mg/kg dry weight (d.w.)</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewage treatment plant</td>
<td></td>
<td></td>
<td></td>
<td>0.0017 mg/L</td>
<td>0.000037</td>
</tr>
</tbody>
</table>

ERC2: Formulation of preparations

Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.114 mg/m3</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number: 100000014136 29/34
<table>
<thead>
<tr>
<th>Procedure</th>
<th>ECETOC TRA</th>
<th>Worker – inhalation, long-term – systemic</th>
<th>1,144 mg/m³</th>
<th>0,079</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,137 mg/kg bw/day</td>
<td>0,041</td>
</tr>
<tr>
<td>PROC2, CS15</td>
<td>Modified</td>
<td>Worker – long-term – systemic Combined routes</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,003 mg/kg bw/day</td>
<td>&lt; 0,01</td>
</tr>
</tbody>
</table>

PROC4, CS55: 

<table>
<thead>
<tr>
<th>Procedure</th>
<th>ECETOC TRA</th>
<th>Worker – inhalation, long-term – systemic</th>
<th>5,719 mg/m³</th>
<th>0,394</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,686 mg/kg bw/day</td>
<td>0,206</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,12</td>
<td></td>
</tr>
</tbody>
</table>

PROC5, CS55: 

<table>
<thead>
<tr>
<th>Procedure</th>
<th>ECETOC TRA</th>
<th>Worker – inhalation, long-term – systemic</th>
<th>5,719 mg/m³</th>
<th>0,394</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,371 mg/kg bw/day</td>
<td>0,412</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,806</td>
<td></td>
</tr>
</tbody>
</table>

PROC9, CS22, CS63: 

<table>
<thead>
<tr>
<th>Procedure</th>
<th>ECETOC TRA</th>
<th>Worker – inhalation, long-term – systemic</th>
<th>5,719 mg/m³</th>
<th>0,394</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,686 mg/kg bw/day</td>
<td>0,206</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,6</td>
<td></td>
</tr>
</tbody>
</table>

PROC8b, CS22, CS63: 

<table>
<thead>
<tr>
<th>Procedure</th>
<th>ECETOC TRA</th>
<th>Worker – inhalation, long-term – systemic</th>
<th>2,86 mg/m³</th>
<th>0,197</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,371 mg/kg bw/day</td>
<td>0,412</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,609</td>
<td></td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
CS55: Batch process

PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;
CS55: Batch process

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS22: Transfer from/pouring from containers
CS63: Vessel / container

PROC8b: Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities
CS22: Transfer from/pouring from containers
CS63: Vessel / container

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set
SAFETY DATA SHEET

Di-tert-Butyl Polysulfide (TBPS 454)

Version 1.12
Revision Date 2018-02-01

by the Exposure Scenario

1. Short title of Exposure Scenario: **Lubricants - Industrial**

   Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

   Sector of use : SU0: Other

   Process category : PROC8b: Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities

   PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

   Environmental release category : ERC7: Industrial use of substances in closed systems

   Further information : not determined

2.1 Contributing scenario controlling environmental exposure for: ERC7: Industrial use of substances in closed systems

   **Amount used**

   Annual amount per site : 8 tonnes/year

   (Msafe) : 0.057 tonnes/day

   **Environment factors not influenced by risk management**

   Flow rate : 18.000 m3/d

   **Other given operational conditions affecting environmental exposure**

   Initial release factor

   Number of emission days per year : 200

   Emission or Release Factor: Air : 0.1 %

   Emission or Release Factor: Water : 0.1 %

   Final release factor

   Emission or Release Factor: Air : 0.1 %

   Emission or Release Factor: Water : 0.1 %

   Emission or Release Factor: Soil : 0 %

   Local release rate: Water : 0.04 kg/day

   Remarks : In the absence of specific information on the use of lubricants containing the substance, a generic release factor of 1E-03 is considered to be a reasonable estimate of release of the substance to water from industrial lubricants

   Local release rate: Air : 0.04 kg/day

   Remarks : In the absence of specific information on the use of lubricants containing the substance, a generic release factor of 1E-03 is considered to be a reasonable estimate of release of the substance to air from industrial lubricants.

   Local release rate: Soil

   Remarks : There is no direct exposure to soil.

   **Technical conditions and measures / Organizational measures**

   Air : Release fraction to air from incineration (Effectiveness: 0.01 %)
**Di-tert-Butyl Polysulfide (TBPS 454)**

**Version 1.12**

**Revision Date 2018-02-01**

<table>
<thead>
<tr>
<th>Water</th>
<th>Release fraction to water from incineration (Effectiveness: 0.01 %)</th>
</tr>
</thead>
</table>

### Conditions and measures related to municipal sewage treatment plant
- **Type of Sewage Treatment Plant**: Municipal sewage treatment plant
- **Flow rate of sewage treatment plant effluent**: 1.000 m³/d
- **Effectiveness (of a measure)**: 91.56%
- **Sludge Treatment**: Agricultural soil, Not applicable

### Conditions and measures related to external treatment of waste for disposal
- **Waste treatment**: No
- **Remarks**: Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.

#### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

**Product characteristics**
- **Physical Form (at time of use)**: Liquid substance
- **Vapor pressure**: < 0.5 kPa
- **Process Temperature**: <= 40 °C

**Frequency and duration of use**
- **Exposure duration**: < 8 h

**Human factors not influenced by risk management**
- **Exposed skin area**: Two hands (960 cm²)

**Other operational conditions affecting workers exposure**
- **Outdoor / Indoor**: Indoor
- **Remarks**: Basic general ventilation (1-3 air changes per hour)

**Technical conditions and measures**
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation- inhalation: Yes (Effectiveness: 95 %)
- Local exhaust ventilation-dermal: No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**
- Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 90 %)
- Respiratory Protection, No

#### 2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

**Product characteristics**
- **Physical Form (at time of use)**: Liquid substance
- **Vapor pressure**: < 0.5 kPa
- **Process Temperature**: <= 40 °C

**Frequency and duration of use**
- **Exposure duration**: < 8 h
Di-tert-Butyl Polysulfide (TBPS 454)

Human factors not influenced by risk management
Exposed skin area: Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure
Outdoor / Indoor: Indoor
Remarks: Basic general ventilation (1-3 air changes per hour)

Technical conditions and measures
Semi-closed process with occasional controlled exposure
Local exhaust ventilation- inhalation: Yes (Effectiveness: 90 %)
Local exhaust ventilation-dermal: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 90 %)
Respiratory Protection, No

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC7</td>
<td>EUSES</td>
<td>Freshwater</td>
<td></td>
<td>Freshwater</td>
<td>0.00017 mg/L</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td></td>
<td>Freshwater sediment</td>
<td>0.084 mg/kg dry weight (d.w.)</td>
<td>0.038</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td></td>
<td>Marine water</td>
<td>0.00017 mg/L</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td>Marine sediment</td>
<td>0.084 mg/kg dry weight (d.w.)</td>
<td>0.038</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agricultural soil</td>
<td></td>
<td>Agricultural soil</td>
<td>0.00012 mg/kg dry weight (d.w.)</td>
<td>0.065</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewage treatment plant</td>
<td></td>
<td>Sewage treatment plant</td>
<td>0.0017 mg/L</td>
<td>0.00037</td>
<td></td>
</tr>
</tbody>
</table>

ERC7: Industrial use of substances in closed systems

<table>
<thead>
<tr>
<th>Workers/Consumers</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC8b, CS22, CS63</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1.716 mg/m³</td>
<td>0.118</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.823 mg/kg bw/day</td>
<td>0.247</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC9, CS22, CS63</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>3.432 mg/m³</td>
<td>0.237</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.412 mg/kg bw/day</td>
<td>0.124</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROC8b: Transfer of substance or preparation (charging/ discharging) from/to vessels/large

SDS Number:100000014136 33/34
Di-tert-Butyl Polysulfide (TBPS 454)

Version 1.12

Revision Date 2018-02-01

containers at dedicated facilities
CS22: Transfer from/pouring from containers
CS63: Vessel / container

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS22: Transfer from/pouring from containers
CS63: Vessel / container

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario