Di-tert-Butyl Polysulfide (TBPS 454)

Version 1.6 Revision Date 2013-05-21

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

Product information

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

Company : Specialty Chemicals
10001 Six Pines Drive
The Woodlands, TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
North America: CHEMTREC 800.424.9300 or 703.527.3887
Asia: +800 CHEMCALL (+800 2436 2255)
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

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

SECTION 2: Hazards identification

Emergency Overview

Form: Liquid **Physical state**: Liquid **Color**: Yellow **Odor**: Mild, sweet
OSHA Hazards : Mild skin irritant

GHS Classification

: Flammable liquids, Category 4
Skin sensitization, Sub-category 1B
Acute aquatic toxicity, Category 1
Chronic aquatic toxicity, Category 1

GHS-Labeling

Symbol(s) :

Signal Word : Warning

Hazard Statements : H227: Combustible liquid
H317: May cause an allergic skin reaction.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statements : **Prevention:**
P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
P272: Contaminated work clothing should not be allowed out of the workplace.
P273: Avoid release to the environment.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P321: Specific treatment (see supplemental first aid instructions on this label).
P333 + P313: If skin irritation or rash occurs: Get medical advice/ attention.
P363: Wash contaminated clothing before reuse.
P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391: Collect spillage.
Storage:
P403 + P235: Store in a well-ventilated place. Keep cool.
Disposal:
P501: Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity:

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

ACGIH No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

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 : $C_8H_{18}S_x$ (x = average of 4.0)
EINECS-No. : 273-103-3

Component	CAS-No.	Weight %
Di-Tert-Butyl Polysulfide	68937-96-2	100

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. 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. 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.
Suitable extinguishing media	:	Carbon dioxide (CO_2).
Unsuitable extinguishing media	:	High volume water jet.
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters	:	Wear self contained breathing apparatus for fire fighting if necessary.
Further information	:	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.
Fire and explosion protection	:	Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.
Hazardous decomposition products	:	Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

Personal precautions	:	Use personal protective equipment.
Environmental precautions	:	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.
Methods for cleaning up	:	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). Keep in suitable, closed containers for disposal.

SECTION 7: Handling and storage

Handling

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 18(4) for transported isolated intermediates. Do not breathe vapors/dust. 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. Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary, but may not by themselves be sufficient. Review all operations, which have the potential to generating and accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106 "Flammable and Combustible Liquids"; National Fire Protection Association (NFPA 77), "Recommended Practice on Static Electricity"; and/or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising Out of Static, Lightning, and stray Currents".
Advice on protection against fire and explosion	:	Do not spray on an open flame or any other incandescent material. 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 a Transported Isolated Intermediate with Strictly Controlled Conditions (SCC) defined in Article 18(4) of Regulation EC No. 1907/2006 and must therefore be handled as such.
Adequate ventilation to control airborned 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 according to the amount and concentration of the dangerous substance at the work place. Wear as appropriate:. Protective suit. Safety shoes. Remove and wash contaminated clothing before re-use. Skin should be washed after contact.
Hygiene measures	:	Wash hands before breaks and at the end of workday.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form	:	Liquid
Physical state	:	Liquid
Color	:	Yellow
Odor	:	Mild, sweet

Safety data

Flash point	:	103 °C (217 °F) Method: ASTM D 93
Lower explosion limit	:	No data available
Upper explosion limit	:	No data available
Oxidizing properties	:	No
Autoignition temperature	:	225 °C (437 °F) at 1,005.20 - 1,009.40 hPa Information given is based on data obtained from similar substances.
Molecular formula	:	C8H18Sx (x = average of 4.0)
Molecular Weight	:	242.5 g/mol
pH	:	Not applicable
Melting point/range	:	-11 °C (12 °F) at 103.25 hPa Information given is based on data obtained from similar substances.
Freezing point		No data available
Boiling point/boiling range	:	172 - 180 °C (342 - 356 °F) (5%-50%), Decomposes
Vapor pressure	:	15.60 Pa at 20 °C (68 °F) Information given is based on data obtained from similar substances.
Density	:	1.0697 G/ML at 20 °C (68 °F)
Water solubility	:	Insoluble
Partition coefficient: n-octanol/water	:	log Pow: 5.6 Information given is based on data obtained from similar substances.
Solubility in other solvents	:	Soluble in hexane and white spirits.
Viscosity, dynamic	:	10 cP at 20 °C (68 °F)
Relative vapor density	:	1 (Air = 1.0)
Evaporation rate	:	Not applicable
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

Conditions to avoid : Heat, flames and sparks.

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 inhalation toxicity

Di-Tert-Butyl Polysulfide : This information is not available.

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.

Di-tert-Butyl Polysulfide (TBPS 454)
Skin irritation : May cause skin irritation and/or dermatitis.

Di-tert-Butyl Polysulfide (TBPS 454)
Eye irritation : Vapors may cause irritation to the eyes, respiratory system and the skin.

Di-tert-Butyl Polysulfide (TBPS 454)
Sensitization : Causes sensitization.

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
Mutagenicity: In vitro tests showed mutagenic effects which were not observed with in vivo test.
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
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 : 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.

Results of PBT assessment

Di-Tert-Butyl Polysulfide : No conclusion can be reached based on available information.
Further testing proposed.

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

SECTION 13: Disposal considerations

The information in this MSDS 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. 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 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 MSDS 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, (E)

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

SARA 311/312 Hazards	:	Acute Health Hazard
CERCLA Reportable Quantity	:	This material does not contain any components with a CERCLA RQ.

SARA 302 Reportable Quantity	:	This material does not contain any components with a SARA 302 RQ.
SARA 302 Threshold Planning Quantity	:	SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 304 Reportable Quantity	:	This material does not contain any components with a section 304 EHS RQ.
SARA 313 Ingredients	:	SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

Ozone-Depletion Potential	:	This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 12 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

US State Regulations

Pennsylvania Right To Know	:	No components are subject to the Pennsylvania Right to Know Act.
Pennsylvania Right To Know	:	Di-Tert-Butyl Polysulfide - 68937-96-2
New Jersey Right To Know	:	No components are subject to the New Jersey Right to Know Act.

New Jersey Right To Know : Di-Tert-Butyl Polysulfide - 68937-96-2

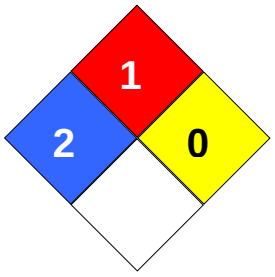
California Prop. 65 Ingredients : This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

Europe REACH	:	On the inventory, or in compliance with the inventory
United States of America US.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 MSDS Number : 627080

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

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

The information provided in this Material 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.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances	NFPA	National Fire Protection Agency

	List		
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		