SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY

Product name: UCON™ Calender Lubricant 51K **Issue Date:** 10/27/2021
Print Date: 10/28/2021

THE DOW CHEMICAL COMPANY encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: UCON™ Calender Lubricant 51K

Recommended use of the chemical and restrictions on use
Identified uses: Selection of the appropriate polyglycol product for a specific application requires knowledge of the fluid requirements of the application, awareness of the most important of these requirements, and a match-up with the properties of the various polyglycol materials. Polyglycol products can be formulated for use in numerous industry applications such as hydraulic fluids, quenchants, compressor and refrigeration lubricants, heat transfer fluids, machinery lubricants, solder assist fluids, metalworking lubricants, textile finishing, etc. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2211 H.H. DOW WAY
MIDLAND MI 48674
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: CHEMTREC +1 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)
Acute toxicity - Category 2 - Inhalation
Skin sensitisation - Category 1
Reproductive toxicity - Category 2
Specific target organ toxicity - repeated exposure - Category 1 - Inhalation
Specific target organ toxicity - repeated exposure - Category 2

Label elements
Hazard pictograms

Signal word: **DANGER!**

Hazards
May cause an allergic skin reaction.
Fatal if inhaled.
Suspected of damaging fertility or the unborn child.
Causes damage to organs (Lungs) through prolonged or repeated exposure if inhaled.
May cause damage to organs (Blood) through prolonged or repeated exposure.

Precautionary statements

Prevention
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe mist or vapours.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing must not be allowed out of the workplace.
Wear protective gloves, protective clothing, eye protection and/or face protection.
In case of inadequate ventilation wear respiratory protection.

Response
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER and/or doctor.
IF exposed or concerned: Get medical advice/ attention.
If skin irritation or rash occurs: Get medical advice/ attention.
Wash contaminated clothing before reuse.

Storage
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Disposal
Dispose of contents and/or container to an approved waste disposal plant.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Polyalkylene glycol monobutyl ether	9038-95-3	>= 90.0 - <= 95.0 %
Carboxylic acid derivative	Trade secret	< 3.0 %
N-phenyl-alpha-naphthylamine	90-30-2	>= 1.0 - <= 2.4 %
Phosphoric acid tricresyl ester	1330-78-5	>= 0.5 - <= 1.5 %
Bisphenol A	80-05-7	< 1.0 %
benzothiazole-2-thiol	149-30-4	< 0.5 %

4. FIRST AID MEASURES

Description of first aid measures
General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation or rash occurs. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: Rinse mouth with water. No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Maintain adequate ventilation and oxygenation of the patient. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Extinguishing media

Suitable extinguishing media: Water fog or fine spray.. Dry chemical fire extinguishers.. Carbon dioxide fire extinguishers.. Foam.. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective..

Unsuitable extinguishing media: Do not use direct water stream.. May spread fire..

Special hazards arising from the substance or mixture

Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating.. Combustion products may include and are not limited to:. Carbon monoxide.. Carbon dioxide.. Combustion products may include trace amounts of:. Nitrogen oxides..

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation.. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids..

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry.. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed.. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles.. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container.. Burning liquids may be extinguished by dilution with water.. Do not use direct water stream. May spread fire.. Move container from fire area if this is possible without hazard.. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage..

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves).. Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location.. For protective equipment in post-fire or non-fire clean-up situations, see Section 8 of the safety data sheet..

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Keep upwind of spill. Refer to section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Spills or discharge to natural waterways is likely to kill aquatic organisms. Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid prolonged or repeated contact with skin. Do not breathe mist. Use only with adequate ventilation. Wash thoroughly after handling. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.
Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Conditions for safe storage: Store in the following material(s): 316 stainless steel. Carbon steel. Glass-lined container. Polypropylene. Polyethylene-lined container. Stainless steel. Teflon. This material may soften and lift certain paint and surface coatings. Use product promptly after opening. Store in original unopened container. Unopened containers of material stored beyond the recommended shelf life should be retested against the sales specifications before use. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact.

Storage stability

Shelf life: Use within
24 Month

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value
Bisphenol A	Dow IHG	TWA Inhalable fraction and vapor	2 mg/m3
benzothiazole-2-thiol	US WEEL	TWA	5 mg/m3
	Further information: Skin; DSEN: Dermal Sensitization Notation		

Exposure controls
Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures
Eye/face protection: Use safety glasses (with side shields).
Skin protection
Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate

("EVAL"). Examples of acceptable glove barrier materials include: Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Liquid.
Color	Brown
Odor	pungent
Odor Threshold	No test data available
pH	No test data available
Melting point/range	No test data available
Freezing point	See Pour Point
Boiling point (760 mmHg)	> 200 °C (> 392 °F) *Calculated.*
Flash point	**closed cup** 241 °C (466 °F) *ASTM D 93*
Evaporation Rate (Butyl Acetate = 1)	<0.01 *Calculated.*
Flammability (solid, gas)	Not applicable to liquids
Flammability (liquids)	Not expected to be a static-accumulating flammable liquid.
Lower explosion limit	No test data available
Upper explosion limit	No test data available
Vapor Pressure	< 0.01 mmHg at 20 °C (68 °F) *ASTM E1719*
Relative Vapor Density (air = 1)	>10 *Calculated.*
Relative Density (water = 1)	1.060 at 20 °C (68 °F) / 20 °C *Calculated.*
Water solubility	Not applicable
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No test data available
Decomposition temperature	No test data available

Kinematic Viscosity	963 - 1120 cSt at 40 °C (104 °F) *ASTM D 445*
Explosive properties	No data available
Oxidizing properties	No data available
Molecular weight	No data available
Molecular formula	Trade secret
Pour point	-30 °C (-22 °F) *ASTM D97*

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No data available

Chemical stability: Thermally stable at typical use temperatures.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials.. Decomposition products can include and are not limited to:. Aldehydes.. Alcohols.. Ethers.. Hydrocarbons.. Ketones.. Organic acids.. Polymer fragments..

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Information on likely routes of exposure
Ingestion, Inhalation, Skin contact, Eye contact.

Acute toxicity (represents short term exposures with immediate effects - no chronic/delayed effects known unless otherwise noted)

Acute oral toxicity

Information for the Product:

Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

As product: Single dose oral LD50 has not been determined.

Based on information for component(s):
LD50, Rat, > 5,000 mg/kg Estimated.

Information for components:

Polyalkylene glycol monobutyl ether
LD50, Rat, > 45,000 mg/kg

Carboxylic acid derivative
LD50, Rat, 1,875 mg/kg

N-phenyl-alpha-naphthylamine
LD50, Rat, 1,625 mg/kg

Phosphoric acid tricresyl ester
LD50, Rat, > 5,000 mg/kg

Bisphenol A
LD50, Rat, male and female, > 2,000 mg/kg

benzothiazole-2-thiol
LD50, Rat, > 2,830 mg/kg

Acute dermal toxicity

Information for the Product:

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined.

Based on information for component(s):
LD50, Rabbit, > 5,000 mg/kg Estimated.

Information for components:

Polyalkylene glycol monobutyl ether
LD50, Rabbit, > 21,140 mg/kg

Carboxylic acid derivative
LD50, Rabbit, 2,006 mg/kg

N-phenyl-alpha-naphthylamine
LD50, Rabbit, > 5,000 mg/kg

Phosphoric acid tricresyl ester
LD50, Rabbit, > 10,000 mg/kg

Bisphenol A
LD50, Rabbit, 3,000 mg/kg

benzothiazole-2-thiol
LD50, Rabbit, > 7,940 mg/kg

Acute inhalation toxicity

Information for the Product:

At room temperature, exposure to vapor is minimal due to low volatility. Prolonged exposure to aerosol/mist may cause serious adverse effects, even death. This product should not be used in aerosol applications.

As product: The LC50 has not been determined.

Based on information for component(s):
LC50, Rat, Aerosol, 0.106 - 0.26 mg/l Estimated.
Information for components:

Polyalkylene glycol monobutyl ether
LC50, Rat, 4 Hour, dust/mist, 0.106 - 0.26 mg/l

Carboxylic acid derivative
For similar material(s): LC50, Rat, male and female, 4 Hour, dust/mist, 5.3 mg/l

N-phenyl-alpha-naphthylamine
Rat, 8 Hour, vapour, No deaths occurred following exposure to a saturated atmosphere.

Phosphoric acid tricresyl ester
Vapor concentrations are attainable which could be hazardous on single exposure.

Rat, 1 Hour, Aerosol, > 11.1 mg/l

Bisphenol A
The LC50 has not been determined.

benzothiazole-2-thiol
LC50, Rat, 4 Hour, dust/mist, > 1.27 mg/l No deaths occurred at this concentration.

Skin corrosion/irritation

Information for the Product:

Based on product testing:
Prolonged contact may cause slight skin irritation with local redness.

Information for components:

Polyalkylene glycol monobutyl ether
Prolonged contact may cause slight skin irritation with local redness.

Carboxylic acid derivative
Prolonged contact may cause slight skin irritation with local redness.
Repeated contact may cause slight skin irritation with local redness.

N-phenyl-alpha-naphthylamine
Brief contact is essentially nonirritating to skin.

Phosphoric acid tricresyl ester
Essentially nonirritating to skin.

Bisphenol A

Brief contact is essentially nonirritating to skin.
Prolonged contact may cause skin irritation with local redness.
Repeated contact may cause skin irritation with local redness.

benzothiazole-2-thiol
Essentially nonirritating to skin.

Serious eye damage/eye irritation

Information for the Product:

Based on product testing:
Essentially nonirritating to eyes.
Corneal injury is unlikely.

Information for components:

Polyalkylene glycol monobutyl ether
Essentially nonirritating to eyes.
Corneal injury is unlikely.

Carboxylic acid derivative
May cause moderate eye irritation.
Corneal injury is unlikely.

N-phenyl-alpha-naphthylamine
May cause slight temporary eye irritation.
Corneal injury is unlikely.

Phosphoric acid tricresyl ester
Essentially nonirritating to eyes.

Bisphenol A
May cause moderate eye irritation.
May cause slight corneal injury.
Dust may irritate eyes.
May cause permanent impairment of vision.

benzothiazole-2-thiol
May cause slight eye irritation.

Sensitization

Information for the Product:

For skin sensitization:
Contains component(s) which have caused allergic skin sensitization in guinea pigs.
A component in this mixture has caused allergic skin reactions in humans.

For respiratory sensitization:
No specific, relevant data available for assessment.

Information for components:

Polyalkylene glycol monobutyl ether
A similar material did not cause allergic skin reactions when tested in humans.

For respiratory sensitization:
No relevant data found.

Carboxylic acid derivative
For similar material(s):
Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

N-phenyl-alpha-naphthylamine
Has caused allergic skin reactions in humans.
Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Phosphoric acid tricresyl ester
Did not demonstrate the potential for contact allergy in mice.

For respiratory sensitization:
No relevant data found.

Bisphenol A
Skin contact may cause an allergic skin reaction.

For respiratory sensitization:
No relevant data found.

benzothiazole-2-thiol
Has caused allergic skin reactions in humans.
Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

Information for the Product:

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Information for components:

Polyalkylene glycol monobutyl ether
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Carboxylic acid derivative
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

N-phenyl-alpha-naphthylamine

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Phosphoric acid tricresyl ester
Available data are inadequate to determine single exposure specific target organ toxicity.

Bisphenol A
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

benzothiazole-2-thiol
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Aspiration Hazard

Information for the Product:

Based on physical properties, not likely to be an aspiration hazard.

Information for components:

Polyalkylene glycol monobutyl ether
Based on physical properties, not likely to be an aspiration hazard.

Carboxylic acid derivative
Based on physical properties, not likely to be an aspiration hazard.

N-phenyl-alpha-naphthylamine
Based on physical properties, not likely to be an aspiration hazard.

Phosphoric acid tricresyl ester
Based on physical properties, not likely to be an aspiration hazard.

Bisphenol A
Based on physical properties, not likely to be an aspiration hazard.

benzothiazole-2-thiol
Based on physical properties, not likely to be an aspiration hazard.

Chronic toxicity (represents longer term exposures with repeated dose resulting in chronic/delayed effects - no immediate effects known unless otherwise noted)

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Information for the Product:

Based on information for component(s):
In animals, effects have been reported on the following organs after exposure to aerosols:
Lung.
Contains component(s) which have been reported to cause effects on the following organs in animals:
Blood

Information for components:

Polyalkylene glycol monobutyl ether
In animals, effects have been reported on the following organs:
Lung.

Carboxylic acid derivative
Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

N-phenyl-alpha-naphthylamine
In animals, effects have been reported on the following organs:
Blood.

Phosphoric acid tricresyl ester
Observations in animals include:
May cause peripheral neuropathy (injury to nerves of the extremities).
In animals, effects have been reported on the following organs:
Adrenal gland.
Testes.
Ovaries.
Kidney.

Bisphenol A
Liver effects and questionable kidney and bladder effects were observed in animals fed bisphenol A.

benzothiazole-2-thiol
Based on available data, repeated exposures to small amounts are not anticipated to cause significant adverse effects.

Carcinogenicity

Information for the Product:

Contains component(s) which did not cause cancer in laboratory animals.

Information for components:

Polyalkylene glycol monobutyl ether
Did not cause cancer in laboratory animals.

Carboxylic acid derivative
No relevant data found.

N-phenyl-alpha-naphthylamine
Did not cause cancer in laboratory animals.

Phosphoric acid tricresyl ester
Did not cause cancer in laboratory animals.

Bisphenol A
No convincing evidence for carcinogenicity of Bisphenol A has been seen in long-term animal studies.

benzothiazole-2-thiol
Has caused cancer in laboratory animals.

Carcinogenicity

Component	List	Classification
benzothiazole-2-thiol	IARC	Group 2A: Probably carcinogenic to humans

Teratogenicity

Information for the Product:

No specific, relevant data available for assessment.

Information for components:

Polyalkylene glycol monobutyl ether
No relevant data found.

Carboxylic acid derivative
For similar material(s): Did not cause birth defects or any other fetal effects in laboratory animals.

N-phenyl-alpha-naphthylamine
For similar material(s): Did not cause birth defects or any other fetal effects in laboratory animals.

Phosphoric acid tricresyl ester
Did not cause birth defects in laboratory animals.

Bisphenol A
Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

benzothiazole-2-thiol
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive toxicity

Information for the Product:

Contains component(s) which have been shown to interfere with fertility in males. Contains component(s) which have been shown to interfere with reproduction in animal studies. Bisphenol A affected reproduction in rats and mice, but only at high exposure levels that exceeded the body's capacity to metabolize and deactivate the chemical. Maintaining exposures below appropriate workplace exposure limits should avoid these and other effects.

Information for components:

Polyalkylene glycol monobutyl ether
No relevant data found.

Carboxylic acid derivative
For similar material(s): In animal studies, did not interfere with reproduction.

N-phenyl-alpha-naphthylamine
In animal studies, a similar material has been shown not to interfere with reproduction.

Phosphoric acid tricresyl ester
In animal studies, has been shown to interfere with fertility in males. In animal studies, has been shown to interfere with reproduction.

Bisphenol A
Bisphenol A affected reproduction in rats and mice, but only at high exposure levels that exceeded the body's capacity to metabolize and deactivate the chemical. Maintaining exposures below appropriate workplace exposure limits should avoid these and other effects.

benzothiazole-2-thiol
In animal studies, did not interfere with reproduction.

Mutagenicity

Information for the Product:

No specific, relevant data available for assessment.

Information for components:

Polyalkylene glycol monobutyl ether
No relevant data found.

Carboxylic acid derivative
For similar material(s): In vitro genetic toxicity studies were negative.

N-phenyl-alpha-naphthylamine
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Phosphoric acid tricresyl ester
In vitro genetic toxicity studies were negative.

Bisphenol A
In vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

benzothiazole-2-thiol
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

Polyalkylene glycol monobutyl ether
Acute toxicity to fish

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 3,170 - 11,900 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), static test, 48 Hour, 17,000 - 19,000 mg/l, OECD Test Guideline 202 or Equivalent

Toxicity to bacteria
EC50, Bacteria, static test, 16 Hour, Growth inhibition, 10,000 mg/l

Carboxylic acid derivative

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, > 100 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
For similar material(s):
EC50, Daphnia dubia (water flea), 48 Hour, > 100 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants
EC50, Pseudokirchneriella subcapitata (green algae), static test, 96 Hour, Growth rate, 110 mg/l

Toxicity to bacteria
EC50, activated sludge, static test, 3 Hour, Respiration rates., 800 mg/l, OECD Test Guideline 209

N-phenyl-alpha-naphthylamine

Acute toxicity to fish
Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, 0.44 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
LC50, Daphnia magna (Water flea), static test, 48 Hour, 0.3 mg/l, OECD Test Guideline 202 or Equivalent

Toxicity to bacteria
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 10,000 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 21 d, 0.032 mg/l

Phosphoric acid tricresyl ester

Acute toxicity to fish
Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 Hour, 0.6 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), static test, 48 Hour, 0.15 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
ErC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate inhibition, > 4.7 mg/l, OECD Test Guideline 201 or Equivalent

Chronic toxicity to fish
NOEC, American flagfish (Jordanella floridae)., semi-static test, 28 d, mortality, 0.01 mg/l

Bisphenol A

Acute toxicity to fish
Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).
LC50, Fathead minnow (Pimephales promelas), 96 Hour, 4.6 mg/l
LC50, Atlantic silverside (Menidia menidia), 96 Hour, 9.4 mg/l

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), 48 Hour, 10.2 mg/l
EC50, saltwater mysid Mysidopsis bahia, 96 Hour, 1.1 mg/l

Acute toxicity to algae/aquatic plants
EC50, Skeletonema costatum (marine diatom), static test, 96 Hour, Growth rate inhibition, 1.1 mg/l

Toxicity to bacteria
EC50, Bacteria, 96 Hour, Respiration rates., > 320 mg/l

Chronic toxicity to fish
NOEC, Fathead minnow (Pimephales promelas), 164 d, mortality, 0.160 mg/l
NOEC, Pimephales promelas (fathead minnow), 444 d, number of offspring, 0.016 mg/l
NOEC, Cyprinodon variegatus (sheepshead minnow), 116 d, number of offspring, 0.066 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, saltwater mysid Mysidopsis bahia, 28 d, number of offspring, 0.17 mg/l
NOEC, Marisa cornuarietis (Giant Ramshorn Snail), 328 d, growth, 0.025 mg/l

benzothiazole-2-thiol

Acute toxicity to fish
Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).
LC50, Lepomis macrochirus (Bluegill sunfish), static test, 96 Hour, 1.5 mg/l, Method Not Specified.
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 Hour, 0.75 mg/l, Method Not Specified.

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), 48 Hour, 0.71 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (algae), 72 Hour, Growth rate inhibition, 0.5 mg/l, OECD Test Guideline 201
NOEC, Pseudokirchneriella subcapitata (algae), 72 Hour, Growth rate inhibition, 0.066 mg/l, OECD Test Guideline 201

Toxicity to bacteria
EC50, Protozoa, 24 Hour, 10 mg/l

Chronic toxicity to fish
NOEC, Oncorhynchus mykiss (rainbow trout), 89 d, 0.041 mg/l
MATC (Maximum Acceptable Toxicant Level), Oncorhynchus mykiss (rainbow trout), 89 d, 0.041 - 0.078 mg/l
LOEC, Oncorhynchus mykiss (rainbow trout), 89 d, 0.078 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 21 d, 0.08 mg/l

Persistence and degradability

Polyalkylene glycol monobutyl ether

Biodegradability: Biodegradation under aerobic static laboratory conditions is moderate (BOD20 or BOD28/ThOD between 10 and 40%).
10-day Window: Fail
Biodegradation: 7 %
Exposure time: 28 d
Method: OECD Test Guideline 301B or Equivalent

Chemical Oxygen Demand: 1.90 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	6.000 %
10 d	13.000 %
20 d	24.000 %

Carboxylic acid derivative

Biodegradability: Biodegradation under aerobic static laboratory conditions is low (BOD20 or BOD28/ThOD between 2.5 and 10%).
10-day Window: Fail
Biodegradation: 9.9 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Photodegradation
Sensitization: OH radicals
Atmospheric half-life: 1.7 - 1.9 Hour
Method: Estimated.
Photodegradation
Sensitization: Ozone.
Atmospheric half-life: 1.4 - 2.1 Hour
Method: Estimated.

N-phenyl-alpha-naphthylamine

Biodegradability: Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301C or Equivalent
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 14 d
Method: OECD Test Guideline 301C or Equivalent

Theoretical Oxygen Demand: 2.99 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	< 5 %
10 d	< 5 %
20 d	< 5 %

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 0.031 d
Method: Estimated.

Phosphoric acid tricresyl ester

Biodegradability: Material is expected to be readily biodegradable.
10-day Window: Not applicable
Biodegradation: 65 - 100 %
Exposure time: 28 d
Method: OECD Test Guideline 301C or Equivalent

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 0.781 d
Method: Estimated.

Bisphenol A

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass
Biodegradation: 93.1 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
10-day Window: Not applicable
Biodegradation: 87 - 95 %
Exposure time: 28 d

Method: OECD Test Guideline 302A or Equivalent

Theoretical Oxygen Demand: 2.52 mg/mg

Photodegradation
Test Type: Half-life (direct photolysis)
Method: Measured

benzothiazole-2-thiol

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Not applicable
Biodegradation: 2.5 %
Exposure time: 14 d
Method: OECD Test Guideline 301C or Equivalent

Bioaccumulative potential

Polyalkylene glycol monobutyl ether

Bioaccumulation: For this family of materials: No bioconcentration is expected because of the relatively high molecular weight (MW greater than 1000).

Carboxylic acid derivative

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): > 4.39 OECD Test Guideline 107

N-phenyl-alpha-naphthylamine

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): 4.20 Measured
Bioconcentration factor (BCF): 427 - 2,730 Fish Measured

Phosphoric acid tricresyl ester

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient: n-octanol/water(log Pow): 6.34 Estimated.

Bisphenol A

Bioaccumulation: Bioconcentration potential is low (BCF less than 100 or log Pow greater than 7).
Partition coefficient: n-octanol/water(log Pow): 3.4 at 21.5 °C OECD Test Guideline 107 or Equivalent
Bioconcentration factor (BCF): 5.1 - 13.3 Cyprinus carpio (Carp) 42 d

benzothiazole-2-thiol

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 2.34 - 2.5 Measured
Bioconcentration factor (BCF): < 0.8 Cyprinus carpio (Carp) 42 d Measured

Mobility in soil

Polyalkylene glycol monobutyl ether

No relevant data found.

Carboxylic acid derivative
Partition coefficient (Koc): 825 Measured

N-phenyl-alpha-naphthylamine
Partition coefficient (Koc): 21000 Estimated.

Phosphoric acid tricresyl ester
Partition coefficient (Koc): > 5000 Estimated.

Bisphenol A
Partition coefficient (Koc): 636 - 931 Measured

benzothiazole-2-thiol
No relevant data found.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(N-phenyl-alpha-naphthylamine, 2-Mercaptobenzothiazole)
UN number	UN 3082
Class	9
Packing group	III
Marine pollutant	N-phenyl-alpha-naphthylamine, 2-Mercaptobenzothiazole
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	Environmentally hazardous substance, liquid, n.o.s.(N-phenyl-

	alpha-naphthylamine, 2-Mercaptobenzothiazole)
UN number	UN 3082
Class	9
Packing group	III

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Acute toxicity (any route of exposure)
Respiratory or skin sensitisation
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 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.

Components	**CASRN**
benzothiazole-2-thiol	149-30-4

Pennsylvania Worker and Community Right-To-Know Act:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Prop. 65
WARNING: This product can expose you to chemicals including benzothiazole-2-thiol, Aniline, Naphthalenamine, Naphthylamine, which is/are known to the State of California to cause cancer, and Bisphenol A, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Hazard Rating System
NFPA

Health	Flammability	Instability
4	1	0

Revision
Identification Number: 99062145 / A001 / Issue Date: 10/27/2021 / Version: 15.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

Dow IHG	Dow Industrial Hygiene Guideline
TWA	8-hr TWA
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)

Full text of other abbreviations
AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

THE DOW CHEMICAL COMPANY urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.
US