

Skydrol® PE-5

Version	Revision Date:	SDS Number:	Date of last issue: -
1.1	05/01/2019	150000093410	Date of first issue: 09/06/2016
PRD		SDSUS / Z8 / 0001	

SECTION 1. IDENTIFICATION

Product name : Skydrol® PE-5

Product code : 34103-00, P3410305, P3410304, P3410302, P3410301, P3410306, P3410307, P3410303, P3410311, P3410309, E3410301

Manufacturer or supplier's details

Company name of supplier : Eastman Chemical Company

Address : 200 South Wilcox Drive
Kingsport TN 37660-5280

Telephone : (423) 229-2000

Emergency telephone : CHEMTREC: +1-800-424-9300, +1-703-527-3887 CCN7321

Recommended use of the chemical and restrictions on use

Recommended use : Hydraulic fluids

Restrictions on use : None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Skin sensitization : Category 1

Carcinogenicity : Category 2

Reproductive toxicity (Oral) : Category 2

Specific target organ systemic toxicity - repeated exposure : Category 2 (Adrenal gland)

GHS label elements

Hazard pictograms :



Signal Word : Warning

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Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child if swallowed.
H373 May cause damage to organs (Adrenal gland) through prolonged or repeated exposure.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Additional Labeling

The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity:
2.85 %

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**Components**

Chemical name	CAS-No.	Concentration (% w/w)
Tributyl phosphate	126-73-8	58 - 68
Triisobutyl phosphate	126-71-6	8 - 10
Phenol, isopropylated, phosphate (3:1)	68937-41-7	5 - < 10

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triphenylphosphate	115-86-6	1.3 - 1.9
7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester	62256-00-2	5.5 - 6.5
butylated hydroxytoluene	128-37-0	0.1 - 1

SECTION 4. FIRST AID MEASURES

- If inhaled : Move to fresh air.
Call a physician or poison control center immediately.
- In case of skin contact : Wash off with soap and plenty of water.
Wash contaminated clothing before re-use.
Get medical attention.
Thoroughly clean shoes before reuse.
- In case of eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- If swallowed : Seek medical advice.
- Most important symptoms and effects, both acute and delayed : Harmful if swallowed.
Causes skin irritation.
May cause an allergic skin reaction.
Suspected of causing cancer.
Suspected of damaging fertility or the unborn child if swallowed.
May cause damage to organs through prolonged or repeated exposure.
Health injuries may be delayed.
Irritation
Pain
Rash
Redness
toxic effects for reproduction
- Notes to physician : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : Carbon dioxide (CO2)
Dry chemical
Water spray
- Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.
Do NOT use water jet.
- Specific hazards during fire fighting : None known.
- Hazardous combustion products : No hazardous combustion products are known

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Further information : None known.

Special protective equipment for fire-fighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Wear appropriate personal protective equipment.
Local authorities should be advised if significant spillages cannot be contained.

Environmental precautions : Avoid release to the environment.

Methods and materials for containment and cleaning up : Sweep up or vacuum up spillage and collect in suitable container for disposal.
Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : None known.

Advice on safe handling : Avoid inhalation of vapor or mist.
Do not get on skin or clothing.
Avoid contact with skin, eyes and clothing.
Do not swallow.
Ensure adequate ventilation.
Wash thoroughly after handling.

Conditions for safe storage : Keep tightly closed.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Ingredients with workplace control parameters**

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Tributyl phosphate	126-73-8	TWA (Inhalable fraction and vapor)	5 mg/m ³	ACGIH
		TWA	0.2 ppm 2.5 mg/m ³	NIOSH REL
		TWA	5 mg/m ³	OSHA Z-1
		TWA	0.2 ppm 2.5 mg/m ³	OSHA P0
triphenylphosphate	115-86-6	TWA	3 mg/m ³	ACGIH

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		TWA	3 mg/m3	NIOSH REL
		TWA	3 mg/m3	OSHA Z-1
		TWA	3 mg/m3	OSHA P0

Engineering measures : Good general ventilation (typically 10 air changes per hour) should be sufficient to control airborne levels.
Ensure adequate ventilation.

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Hand protection

Remarks : Wear suitable gloves.

Eye protection : Safety glasses

Protective measures : Remove respiratory and skin/eye protection only after vapors have been cleared from the area.
Ensure that eye flushing systems and safety showers are located close to the working place.
Use personal protective equipment as required.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : oily

Color : purple

Odor : odorless

Odor Threshold : not determined

pH : not determined

Melting point/range : < -80 °F / -62 °C

Boiling point/boiling range : not determined

Flash point : 344.8 °F / 173.8 °C
Method: Cleveland open cup

Evaporation rate : not determined

Flammability (solid, gas) : Not applicable

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Self-ignition	:	799.9 °F / 426.6 °C Method: ASTM D2155
Upper explosion limit / Upper flammability limit	:	not determined
Lower explosion limit / Lower flammability limit	:	not determined
Vapor pressure	:	0.4 hPa (77 °F / 25 °C)
Relative vapor density	:	not determined
Relative density	:	0.995 (77 °F / 25 °C)
Density	:	995 kg/m3 (77 °F / 25 °C)
Autoignition temperature	:	not determined
Decomposition temperature	:	not determined
Viscosity		
Viscosity, dynamic	:	not determined
Viscosity, kinematic	:	9.02 - 10.02 mm2/s (100 °F / 38 °C)
Explosive properties	:	Not classified
Oxidizing properties	:	Not classified

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	None reasonably foreseeable.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Stable None known.
Conditions to avoid	:	None known.
Incompatible materials	:	Strong oxidizing agents
Hazardous decomposition products	:	Carbon dioxide (CO2) Carbon monoxide

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Harmful if swallowed.

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Acute oral toxicity : Acute toxicity estimate: 751.5 mg/kg
Method: Calculation method

Remarks: Harmful if swallowed.

Acute inhalation toxicity : Remarks: No significant adverse effects were reported

Acute dermal toxicity : Remarks: No significant adverse effects were reported

Components:**Tributyl phosphate:**

Acute inhalation toxicity : LC50 (Rat, Male and Female): > 4.242 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 Dermal (Rabbit, Male and Female): > 3,100 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Triisobutyl phosphate:

Acute oral toxicity : LD50 Oral (Rat): > 5,000 mg/kg
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity : LC50 (Rat): > 5.14 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 Dermal (Rabbit): > 5,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Phenol, isopropylated, phosphate (3:1):

Acute oral toxicity : LD50 Oral (Rat): > 5,000 mg/kg
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity : LC50 (Rat): > 200 mg/m3
Exposure time: 1 h
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 Dermal (Rabbit): > 10,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

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Acute dermal toxicity : LD50 Dermal (Rabbit, Male and Female): > 7,940 mg/kg

triphenylphosphate:

Acute oral toxicity : LD50 Oral (Rat, male): > 6,400 mg/kg

Acute dermal toxicity : LD50 Dermal (Guinea pig, male): > 5,000 mg/kg

Skin corrosion/irritation

Causes skin irritation.

Product:

Remarks : Causes skin irritation.

Components:**Tributyl phosphate:**

Species : Rabbit
Exposure time : 4 h
Assessment : Causes skin irritation.
Result : irritating

Triisobutyl phosphate:

Species : Rabbit
Exposure time : 4 h
Result : Mild skin irritation

Phenol, isopropylated, phosphate (3:1):

Species : Rabbit
Assessment : Not classified

7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

Species : Rabbit
Exposure time : 24 h
Assessment : Not classified as hazardous.
Result : slight to moderate irritation

triphenylphosphate:

Species : Guinea pig
Remarks : Non-irritating to the skin.

Serious eye damage/eye irritation

Not classified based on available information.

Components:**Tributyl phosphate:**

Species : Rabbit
Result : slight irritation
Exposure time : 24 h

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Assessment : Not classified

Triisobutyl phosphate:

Species : Rabbit
Result : slight
Assessment : Not classified

Phenol, isopropylated, phosphate (3:1):

Species : Rabbit
Result : none
Assessment : Not classified

7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

Species : Rabbit
Result : slight irritation
Exposure time : 24 h
Assessment : Not classified

triphenylphosphate:

Species : Rabbit
Result : slight

Respiratory or skin sensitization**Skin sensitization**

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Product:

Remarks : May cause an allergic skin reaction.

Components:**Tributyl phosphate:**

Test Type : Skin Sensitization
Species : Guinea pig
Assessment : Not classified
Result : Does not cause skin sensitization.

Test Type : Skin Sensitization
Species : Humans
Assessment : Not classified
Result : Does not cause skin sensitization.

Triisobutyl phosphate:

Test Type : OECD 406: Guinea pig sensitization
Species : Guinea pig
Method : OECD 406: Guinea pig sensitization

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Result : May cause sensitization by skin contact.

7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

Test Type : Skin Sensitization
Species : Guinea pig
Result : May cause sensitization by skin contact.

Germ cell mutagenicity

Not classified based on available information.

Components:**Tributyl phosphate:**

Genotoxicity in vitro : Test Type: Mutagenicity - Bacterial
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

Test Type: Mutagenicity - Mammalian
Metabolic activation: +/- activation
Method: In vitro Mammalian Chromosome Aberration Test
Result: equivocal

Genotoxicity in vivo : Species: Rat (Male and Female)
Application Route: oral: gavage
Method: Mammalian Bone Marrow Chromosome Aberration Test
Result: negative

Triisobutyl phosphate:

Genotoxicity in vitro : Test Type: Salmonella typhimurium assay (Ames test)
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

Genotoxicity in vivo : Result: negative

7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

Genotoxicity in vitro : Test Type: Salmonella typhimurium assay (Ames test)
Metabolic activation: +/- activation
Method: Bacterial Reverse Mutation Assay
Result: negative

Test Type: Mutagenicity - Mammalian
Metabolic activation: +/- activation
Method: In vitro Mammalian Chromosome Aberration Test
Result: equivocal

Test Type: Mutagenicity - Mammalian
Metabolic activation: +/- activation
Method: In vitro Mammalian Cell Gene Mutation Test

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Result: negative

Genotoxicity in vivo : Species: Rat (Male and Female)
Application Route: intraperitoneal injection
Method: Mammalian Bone Marrow Chromosome Aberration Test
Result: equivocal

Carcinogenicity

Suspected of causing cancer.

Components:**Tributyl phosphate:**

Species : Rat, Male and Female
Application Route : Ingestion
Method : EPA OTS 798.3300
Remarks : Limited evidence of a carcinogenic effect.
May cause cancer.

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.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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.

Reproductive toxicity

Suspected of damaging fertility or the unborn child if swallowed.

Components:**Phenol, isopropylated, phosphate (3:1):**

Effects on fertility : Species: Rat, male and female
Application Route: Oral
General Toxicity Parent: NOAEL: 25 milligram per kilogram
Remarks: Suspected of damaging fertility or the unborn child.

triphenylphosphate:

Reproductive toxicity - Assessment : Based on available data, the classification criteria are not met.

STOT-single exposure

Not classified based on available information.

Components:**Tributyl phosphate:**

Assessment : Based on available data, the classification criteria are not met.

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Triisobutyl phosphate:

Assessment : Not classified

Phenol, isopropylated, phosphate (3:1):

Remarks : Not classified due to data which are conclusive although insufficient for classification.

STOT-repeated exposure

May cause damage to organs (Adrenal gland) through prolonged or repeated exposure.

Components:**Tributyl phosphate:**

Assessment : Based on available data, the classification criteria are not met.

Triisobutyl phosphate:

Assessment : Not classified

Phenol, isopropylated, phosphate (3:1):

Assessment : May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity**Components:****Tributyl phosphate:**

Species	: Mouse, Male and Female
	: 75 mg/kg
Application Route	: in feed
Exposure time	: 90 days

Triisobutyl phosphate:

Species	: Rat, male
	: 68.4 mg/kg
Application Route	: Oral Study
Exposure time	: 90 days

Aspiration toxicity

Not classified based on available information.

Product:

No aspiration toxicity classification

Components:**Triisobutyl phosphate:**

Not classified

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7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

Not applicable

Further information**Product:**

Remarks : None known.

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity****Components:****Tributyl phosphate:**Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4.2 mg/l
Exposure time: 96 hToxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 1.8 mg/l
aquatic invertebrates Exposure time: 48 hToxicity to algae/aquatic : EC50 (Desmodesmus subspicatus (green algae)): 1.1 mg/l
plants Exposure time: 72 hToxicity to fish (Chronic tox- : NOEC (Oncorhynchus mykiss (rainbow trout)): 0.82 mg/l
icity) Exposure time: 95 d

1.7 mg/l

Toxicity to daphnia and other : NOEC (Daphnia magna (Water flea)): 1.3 mg/l
aquatic invertebrates (Chron- Exposure time: 21 d
ic toxicity)**Triisobutyl phosphate:**Toxicity to fish : EC50 (Leuciscus idus (Golden orfe)): 17.8 - 21.5 mg/l
Exposure time: 96 hToxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 11 mg/l
aquatic invertebrates Exposure time: 48 hToxicity to algae/aquatic : ErC50 (Scenedesmus subspicatus): 34.1 mg/l
plants Exposure time: 72 hToxicity to microorganisms : EC50 (Bacteria): 37.2 mg/l
Exposure time: 28 d**Phenol, isopropylated, phosphate (3:1):**Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 0.36 mg/l
Exposure time: 96 h

LC50 (Cyprinodon variegatus (sheepshead minnow)): > 1.3

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mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 1 mg/l
Exposure time: 48 h

LC50 (Mysidopsis bahia (opossum shrimp)): > 1 mg/l

Toxicity to algae/aquatic plants : NOEC (Desmodesmus subspicatus (green algae)): 0.25 - 2.5 mg/l
Exposure time: 72 h
Test Type: Alga, Growth Inhibition Test

M-Factor (Acute aquatic toxicity) : 1

M-Factor (Chronic aquatic toxicity) : 1

triphenylphosphate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 0.4 mg/l
Exposure time: 96 h

M-Factor (Acute aquatic toxicity) : 1

Persistence and degradability**Components:****Tributyl phosphate:**

Biodegradability : Result: Readily biodegradable.

Triisobutyl phosphate:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 70 - 80 %
Exposure time: 28 d
Method: Ready Biodegradability: CO2 Evolution Test

Phenol, isopropylated, phosphate (3:1):

Biodegradability : Remarks: Not readily biodegradable.

7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 2-ethylhexyl ester:

Biodegradability : Concentration: 100 mg/l
Method: Ready Biodegradability: Modified MITI Test (I)
Remarks: Readily biodegradable

triphenylphosphate:

Biodegradability : Result: Readily biodegradable.

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Bioaccumulative potential**Components:****Tributyl phosphate:**

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 20
Exposure time: 56 d
Method: OECD Test Guideline 305

Bioconcentration factor (BCF): 35
Exposure time: 38 d

Partition coefficient: n-octanol/water : Pow: 10,100

Triisobutyl phosphate:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 3.72

Phenol, isopropylated, phosphate (3:1):

Bioaccumulation : Remarks: Potential bioaccumulation

triphenylphosphate:

Partition coefficient: n-octanol/water : log Pow: 4.63

Mobility in soil**Components:****Phenol, isopropylated, phosphate (3:1):**

Distribution among environmental compartments : log Koc: 3.43 - 3.93

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS**Disposal methods**

Waste from residues : Dispose of in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION**International Regulations**

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IATA-DGR

UN/ID No. : UN 3082
Proper shipping name : Environmentally hazardous substance, liquid, n.o.s. (triphenyl phosphate)
Class : 9
Packing group : III
Labels : Miscellaneous
Packing instruction (cargo aircraft) : 964
Packing instruction (passenger aircraft) : 964
Remarks : Shipping in package sizes of less than 5 L (liquids) or 5 KG (solids) may lead to a non-regulated classification.

IMDG-Code

UN number : UN 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (triphenyl phosphate)
Class : 9
Packing group : III
Labels : 9
EmS Code : F-A, S-F
Marine pollutant : yes
Remarks : Shipping in package sizes of less than 5 L (liquids) or 5 KG (solids) may lead to a non-regulated classification.

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

Not applicable for product as supplied.

Domestic regulation**49 CFR**

UN/ID/NA number : UN 3082
Proper shipping name : Environmentally hazardous substance, liquid, n.o.s. (triphenyl phosphate)
Class : 9
Packing group : III
Labels : Class 9 - Miscellaneous Dangerous Goods
ERG Code : 171
Marine pollutant : yes(triphenyl phosphate)
Remarks : Above applies only to containers over 119 gallons or 450 liters. Not regulated if shipped in packages less than or equal to 119 gallons (450 liters).

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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SECTION 15. REGULATORY INFORMATION**EPCRA - Emergency Planning and Community Right-to-Know****CERCLA Reportable Quantity**

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Skin corrosion or irritation
Respiratory or skin sensitization
Carcinogenicity
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

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.

The ingredients of this product are reported in the following inventories:

DSL : All components of this product are on the Canadian DSL

AICS : On the inventory, or in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

ISHL : Not listed

KECI : Not listed

PICCS : Not listed

IECSC : On the inventory, or in compliance with the inventory

TCSI : On the inventory, or in compliance with the inventory

TSCA : All substances listed as active on the TSCA inventory

TSCA list

The following substance(s) is/are subject to a Significant New Use Rule:
Potassium decafluoro- 67584-42-3
ro(pentafluoroethyl)cyclohexanesulphonate

No substances are subject to TSCA 12(b) export notification requirements.

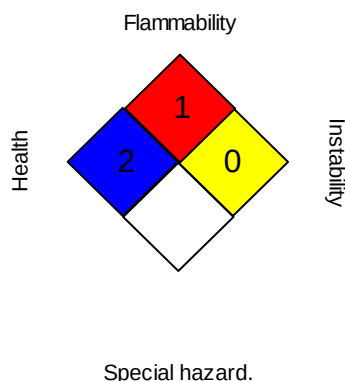
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SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:

HEALTH	*	2
FLAMMABILITY		1
PHYSICAL HAZARD		0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA P0	:	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA P0 / TWA	:	8-hour time weighted average
OSHA Z-1 / TWA	:	8-hour time weighted average

AICS - Australian Inventory of Chemical Substances; 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)

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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; 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

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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.

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