



MATERIAL SAFETY DATA SHEET

DAEHEUNG CHEMICAL CO., LTD. www.dhcbond.com

PGM

Product Name

D-5400SP

1. Product and Company Identification

- A. Product Name D-5400SP
- B. Recommended use of the chemical and restrictions on use
- Recommended use of the chemical Bond the Metal, wood, rubber, HPM, plastics etc.
 - Restrictions on use of the product Do not use for purposes other than adhesive.
- C. Manufacturer/Supplier/Distributor Information
- Name DAEHEUNG CHEMICAL CO., LTD.
 - Address 68, Sandan-ro 64beon-gil, Pyeongtaek-si, Gyeonggi-do, Korea
 - Emergency phone number 82-31-668-1424

2. Hazards identification

- A. Hazard-Risk Classification
- Flammable Liquid : Category 2
- Acute toxicity (inhalation) : category 4
- Skin Corrosion/Irritation : Category 2
- Serous Eyes Damage/Eye Irritation : Category 2
- Reproductive Toxicity : Category 2
- Specsific Target Organ Toxicity (Single Exposure) : Category 1
- Specsific Target Organ Toxicity (Single Exposure) : Category 3(Narcotic effects)
- Specsific Target Organ Toxicity (Single Exposure) : Category 3(Respiratory tract irritation)
- Specsific Target Organ Toxicity (Repeated Exposure) : Category 1
- Aspiration Harzard : Category 1
- Hazardous to the aquatic environment, acute toxicity : Category 1

B. Label elements including precautionary statements

- Symbol



- Signal Word

Danger

- Hazard-Risk Statement

H225 Highly flammable liquid and vapour.

H304 May be fatal if swallowed and enters airways

H315 Causes skin irritation

H319 Causes serious eye irritation.

H332 Harmful if inhaled

H335 May cause respiratory irritation.

H336 May cause drowsiness or dizziness.

H361 Suspected of damaging fertility or the unborn child

H370 Causes damage to organs

H372 Causes damage to organs through prolonged or repeated exposure

H400 Very toxic to aquatic life

- Precautionary Statement

Prevention

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

Prevention

P210 Keep away from heat/sparks/open flames/hot surfaces – No smoking.

Response	P233 Keep container tightly closed.
	P240 Ground/bond container and receiving equipment.
	P241 Use explosion-proof electrical/ventilating/light/.../equipment.
	P242 Use only non-sparking tools.
	P243 Take precautionary measures against static discharge.
	P260 Do not breathe dust/fume/gas/mist/vapours/spray.
	P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
	P264 Wash thoroughly after handling.
	P270 Do not eat, drink or smoke when using this product.
	P271 Use only outdoors or in a well-ventilated area.
	P273 Avoid release to the environment
	P280 Wear protective gloves/protective clothing/eye protection/face protection.
	P281 Use personal protective equipment as required.
	P301+310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
	P302+352 IF ON SKIN: Wash with soap and water
	P303+361+353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
	P304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
	P305+351+338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
	P307+311 IF exposed: Call a POISON CENTER or doctor/physician.
	P308+313 IF exposed or concerned: Get medical advice/attention.
	P312 Call a POISON CENTER or doctor/physician if you feel unwell.
	P314 Get Medical advice/attention if you feel unwell.
	P321 Specific treatment (see 4. First aid measures on this label)
	P331 Do NOT induce vomiting
	P332+313 If skin irritation occurs: Get medical advice/attention
	P337+313 If eye irritation persists get medical advice/attention.
	P362 Take off contaminated clothing and wash before reuse
	P391 Collect spillage
Storage	P403+233 Store in a well ventilated place. Keep container tightly closed.
	P403+235 Store in a well ventilated place. Keep cool.
	P405 Store locked up.
Disposal	P501 Dispose of contents/container to ...

C. Other Hazard-Risk which are not included in the classification criteria (e.g. dust explosion hazard)

TOLUENE	
Health	2
Fire	3
Reactivity	0
CYCLOHEXANE	
Health	1
Fire	3
Reactivity	0
HEXANE	
Health	No data available
Fire	3
Reactivity	0
ACEOTNE	
Health	1

Fire	3
Reactivity	0
NEOPRENE	
Health	1
Fire	1
Reactivity	0
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	
Health	1
Fire	1
Reactivity	0

3. Composition/Information on ingredients

Chemical Name	Other name	CAS number	Content(%)
TOLUENE	METHYLBENZENE Toluol	108-88-3	20~30
CYCLOHEXANE	HEXAHYDROBENZENE Cyclo-hexane	110-82-7	15~20
HEXANE	NOMALHEXANE n-HEXANE Nomal-hexane n-hexane Hexane, n-Hexane	110-54-3	10~20
ACETONE	2-PROPANONE	67-64-1	5~15
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	PHENOL, P-tert-BUTYL-,	25085-50-1	5~15
NEOPRENE	SYNTHETIC RUBBER	9010-98-4	10~20

4. First aid measures

A. Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. If eye irritation persists get medical advice/attention
B. Skin contact	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention Remove and isolate contaminated clothing and shoes. Evacuate area In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin. Wash with soap and water.
C. Inhalation	Do NOT induce vomiting. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
D. Ingestion	Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.
E. Indication of immediate medical attention and notes for physician	Call a POISON CENTER or doctor/physician. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. Fire-Fighting measures

A. Suitable (and unsuitable) extinguishing media	Dry chemical, CO ₂ , sand, earth, water spray or regular foam.
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B. Specific hazards arising from the chemical (e.g. nature of any hazardous combustion products)

Extremely flammable liquid and vapour

Those substances designated with a (P) may polymerize explosively when heated or involved in a fire.

Vapors may travel to source of ignition and flash back.

Fire may produce irritating, corrosive and/or toxic gases.

Substance may be transported in a molten form at a temperature that may be above its flash point.

Containers may explode when heated.

May be ignited by friction, heat, sparks or flames.

LIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.

C. Special protective equipment and precautions for fire-fighters

Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.

Fight fire with normal precautions from a reasonable distance

Many liquids are lighter than water.

Vapors from liquefied gas are initially heavier than air and spread along ground.

Dike far ahead of liquid spill for later disposal.

Move containers from fire area if you can do it without risk.

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

Cool containers with flooding quantities of water until well after fire is out.

Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

ALWAYS stay away from tanks engulfed in fire.

For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures

Avoid breathing dust/fume/gas/mist/vapours/spray

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.

Isolate spill or leak area immediately for at least 500 meters (1/3 mile) in all directions.

Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

All equipment used when handling the product must be grounded.

Stop leak if you can do it without risk.

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

B. Environmental precautions and protective procedures

Prevent entry into waterways, sewers, basements or confined areas.

C. Methods and materials for containment and cleaning up

Dike fire-control water for later disposal; do not scatter the material.

Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Use clean non-sparking tools to collect absorbed material.

C. Methods and materials for containment and cleaning up

Dike far ahead of liquid spill for later disposal.

7. Handling and storage

A. Precautions for safe handling	<p>Do not handle until all safety precautions have been read and understood.</p> <p>Use explosion-proof electrical/ventilating/light/.../equipment.</p> <p>Use only non-sparking tools.</p> <p>Avoid breathing dust/fume/gas/mist/vapours/spray.</p> <p>Wash thoroughly after handling.</p> <p>Do not eat, drink or smoke when using this product.</p> <p>Use only outdoors or in a well-ventilated area.</p> <p>Keep cool. Protect from sunlight.</p> <p>All equipment used when handling the product must be grounded.</p> <p>Store in a well ventilated place. Keep container tightly closed</p> <p>Heating may cause a fire or explosion</p> <p>Keep out of low areas.</p> <p>Ventilate closed spaces before entering.</p>
B. Conditions for safe storage (including any incompatibilities)	<p>Keep away from heat/sparks/open flames/hot surfaces – No smoking</p> <p>Store in a well ventilated place. Keep container tightly closed</p> <p>Store in a well ventilated place. Keep cool</p> <p>Do not eat, drink or smoke when using this product</p>

8. Exposure controls & personal protection

A. Control parameters (e.g. occupational exposure limit values, biological limit values)	
– Occupational exposure limit values	
TOLUENE	TWA – 50ppm 188mg/m3 STEL – 150ppm 560mg/m3
CYCLOHEXANE	TWA – 200ppm 700mg/m3
HEXANE	TWA – 50ppm 180mg/m3
ACETONE	TWA – 500ppm 1188mg/m3 STEL – 750ppm 1782mg/m3
PARA-TERTIARY-BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
– ACGIH limit values	
TOLUENE	TWA 20 ppm 75 mg/m³
CYCLOHEXANE	TWA 100 ppm
HEXANE	TWA 50 ppm
ACETONE	TWA 500 ppm
	STEL 750 ppm
PARA-TERTIARY-BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
– Biological limit values	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
B. Appropriate engineering controls	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate ventilation.
C. Personal protective equipment	
– Respiratory protection	The filter class must be suitable for the maximum contaminant concentration(gas/vapour/aerosol/particulates) that may arise when handling the product.

- Eye protection
- Hands protection
- Body protection

If the concentration is exceeded, closed-circuit breathing apparatus must be used!.

In case of fire: Wear self contained breathing apparatus.

Wear eye protection/face protection.

Wear proper chemical resistant gloves.

Wear proper Protective clothing.

9. Physical and chemical properties

A. Appearance	
Physical state	Viscous liquid
Color	Light yellow
B. Odour	Solvent odour
C. Odour threshold	No date available
D. pH	Not applicable
E. Melting point/freezing point	Not applicable
F. Initial boiling point and boiling range	56°C
G. Flashing point	-18°C (Rapid equilibrium method)
H. Evaporation rate	No date available
I. Flammability(solid, gas)	No date available
J. Upper/lower flammability or explosive limits	13% / 1.1%
K. Vapor pressure	232mmHg (at 25°C)
L. Solubility	Not soluble in water
M. Vapor density	3.14
N. Relative density	0.82
O Partition coefficient:n-octanol/water	No date available
P. Auto-ignition temperature	480°C
Q. Decomposition temperature	No date available
R. Viscosity	400±10cps (at 20°C)
S. Formula mass	No date available

10. Stability and reactivity

A. Chemical stability and possibility of hazardous reactions	Extremely flammable liquid and vapour Fire will produce irritating, corrosive and/or toxic gases. Containers may explode when heated. HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames. Runoff to sewer, indoors, outdoors may create fire or explosion hazard. Vapors may travel to source of ignition and flash back. Vapors may cause dizziness or asphyxiation without warning. May be harmful by inhalation, ingestion and skin absorption.
B. Conditions to avoid (e.g. static discharge, shock or vibration, etc)	Keep away from heat/sparks/open flames/hot surfaces – No smoking.
C. Incompatible materials	Irritant, toxic gas Flammable materials
D. Hazardous decomposition products	Fire may produce irritating, corrosive and/or toxic gases.

11. Toxicological information

A. Information on the likely routes of exposure

TOLUENE	Occupational exposure to toluene may occur through inhalation and dermal contact with this compound at workplaces where toluene is produced or used(SRC). The general population may be exposed to toluene via inhalation of ambient air, ingestion of food and drinking water, handling of gasoline, and exposure to some consumer products where toluene is used as a solvent(SRC). (HSDB)
CYCLOHEXANE	Occupational exposure to cyclohexane may occur through inhalation and dermal contact with this compound at workplaces where cyclohexane is produced or used(SRC). The general population may be exposed to cyclohexane via inhalation of ambient air, ingestion of drinking water, and dermal contact with consumer products containing cyclohexane.
HEXANE	Occupational exposure to n-hexane may occur through inhalation and dermal contact with this compound at workplaces where n-hexane is produced or used. Monitoring data indicate that the general population may be exposed to n-hexane primarily via inhalation of ambient air(SRC).
ACETONE	Exposure will also arise from inhalation of ambient air, ingestion of drinking water, and food that contains acetone(SRC).
B. Health hazards information	
– Acute toxic	
Oral	
TOLUENE	LD50 2600 mg/kg Rat
CYCLOHEXANE	LD50 12705 mg/kg
HEXANE	LD50 25000 mg/kg Rat
ACETONE	LD50 5280 mg/kg Rat (EHC(1990), SIDS(1997))
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	LD50 40000 mg/kg Rat
Dermal	
TOLUENE	LD50 120000 mg/kg Rat
CYCLOHEXANE	LD50 > 2000 mg/kg Rabbit
HEXANE	No data available
ACETONE	LD50 12870 mg/kg Rabbit (EHC(1990), PATTY(1994), SIDS(1997))
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	No data available
Inhalation	
TOLUENE	LC50 12.5 mg/ℓ 4 hr Rat
CYCLOHEXANE	LC50 70 mg/ℓ
HEXANE	LC50 77000 ppm 1 hr
ACETONE	LC50 32000 ppm Rat
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	No data available
– Skin corrosive/irritant	
TOLUENE	Based on the evidence of moderate skin irritation caused by toluene in rabbit primary skin irritation test (4 hour exposure) (EU-RAR No. 30, 2003).
CYCLOHEXANE	There are statements of skin irritation on rabbits and humans (DFGOT vol.13 (1999), EU-RAR (2004), ACGIH (2002), and ICSC (J) (1994)). Although the crack and bleeding was observed on the skin by the repeated dministration on rabbits, it recovered in one week after the end of medication (DFGOT vol.13 (1999)). And there is a description that when concentrate solution adhered on humans for 1 hour, it caused redness and wheal (EU-RAR (2004)), but this is also considered to be a disorder of recovery nature.
HEXANE	It was set as Category 2 from description that skin irritation was seen in humans evidence of exposure (MOE Risk Assessment The 1st volume (2002), EHC 122 (1993), DFGOT vol.14 (2000), PATTY (4th, 1994), ATSDR (1999)).

ACETONE	It was classified as out of Category from the statement of having no stimulativeness on rabbit skin (EHC 207 (1998)) and (SIDS (1999)).
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	Irritation
- Serious eye damage/eye irritation	
TOLUENE	Based on the description that the subjects recovered from the damage within 7 days in rabbit eye irritation test conducted in accordance with the OECD test guideline (EU-RAR No. 30, 2003), which suggests that toluene causes mild eye irritation.
CYCLOHEXANE	Since there was a statement that in rabbits corneal cloudings, iritis, conjunctival hyperemias, and chemosis each are seen reversible (EU-RAR (2004), as well as in animals and in humans irritation is in the eye (PATTY (5th, 2001), EU-RAR (2004), ICSC (J), (1994), HSDB (2005))
HEXANE	Based on the description that the ocular irritant property was acknowledged in human exposure examples (MOE Risk Assessment 1st volume (2002)), and on the description that mild irritant property was acknowledged in the rabbits (DFGOT vol.14 (2000)). The level of irritation and resilience are unknown, therefore deliberate categorization was impossible.
ACETONE	Vapor stimulates public eye. However, if exposure stops, irritation will not follow (ATSDR (1994)). The result of severe is reported in the rabbit (ACGIH (2001)). Although a corneal epithelium is destroyed, substrate is not destroyed, and destruction of a corneal epithelium will be recovered in 4-6 days. Acetone is not corrosive eye irritations (SIDS (1999)). It was set as Category 2B from the above description.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	Irritation
- Respiratory sensitization	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Skin sensitization	
TOLUENE	Based on the results of guinea pig maximization tests (EU-RAR No. 30, 2003) suggesting that toluene causes no skin irritation.
CYCLOHEXANE	Although a result that did not have skin sensitization in the GLP test is indicated(EU-RAR (2004)), this test is described to have been an inadequate one. On the other hand, it is indicated that there is no example in humans in the reserve column.
HEXANE	Although we have descriptions in which it is supposed that sensitizing was not acknowledged in EHC 122 (1993) and DFGOT vol.4 (1992) by Maximization test for 25 humans, we presupposed that we could not classify it since this report singularly is inadequate for considering it as a clear proof of there being no sensitizing property.
ACETONE	Since it was indicated negative by the Mouse ear swelling test and Guinea pig maximization test(SIDS (1999)), the skin sensitization was put outside of the Category.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Carcinogenicity	
IARC	
TOLUENE	Group 3
CYCLOHEXANE	No data available

HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	Group 3
OSHA	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
ACGIH	
TOLUENE	A4
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	A4
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
NTP	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
EU CLP	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Germ Cell Mutagenicity	
TOLUENE	Based on negative data on heritable mutagenicity tests (dominant lethal tests), the absence of data on germ cell mutagenicity and genotoxicity tests in vivo and the positive data on somatic cell mutagenicity tests in vivo (micronucleus tests, chromosome aberration tests), described in EHC 52 (1986), EU-RAR No. 30 (2003), IARC 71(1999)and ATSDR (2000), although the positive results obtained in vivo were not conclusive. Meanwhile, although some assessment documents have put "+" marks in the result tables (EU marked "negative" for all tests in the result table), all documents have comprehensively concluded that the substance is negative. Moreover, the test conducted in the former Soviet Union in 1970's was suspected of benzene contamination, and all Priority 1 assessment documents have judged the substance as negative. Considering the fact that negative results have been obtained in 6 other tests, the substance was considered negative for in vivo mutagenicity.
CYCLOHEXANE	Based on the fact that there was no result of human over generation epidemiology, over generation mutagenicity test, and the productive cell in vivo mutagenicity test, and based on the negative result in the somatic cell in vivo mutagenicity test (chromosomal aberration test using rat myeloid cells) (DFGOT vol.13 (1999)).

HEXANE	There is negative result by the dominant lethal test using rodents (EHC 122 (1993), DFGOT vol.4 (1992), ATSDR (1999)), and by the micronucleus test using mammalian erythrocyte(ATSDR (1999)), and by the chromosomal aberration test using mammals marrow cells (DFGOT vol.4 (1992))
ACETONE	We found the negative results for in vivo micronucleus examination (SIDS (1999), EHC 207 (1998)), therefore we classified it as Out Of Category by the technical guideline.
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Reproductive toxicity	
TOLUENE	Based on the results of human epidemiological studies suggesting increased incidence of natural abortion after toluene exposure, abnormal development and malformation of newborns caused by prenatal toluene abuse and decreased plasma concentrations of luteinizing hormone and testosterone after toluene exposure, described in IRIS Toxicological review (2005), EU-RAR No.30 (2003), IARC 71(1999), IARC 47 (1989), EHC 52 (1986) and ATSDR (2000), the following conclusion by Ng et al. (1992) in EU RAR30 (2003): "the study suggests an increased risk of late spontaneous abortions associated with exposure to toluene at levels around 88 ppm (range 50–150 ppm). The results of this study are used as a basis for the risk characterisation of developmental toxicity in humans,"and the evidence of increased incidences of foetal death and delayed ossification, a decrease and unossification of sternebrae, a shift in rib profile, excess ribs, retarded skeletal development, delayed reflex response, learning disability and early vaginal opening and testes descent at dosing levels not toxic to dams from rat and mouse teratogenicity tests. According to Da-Silva et al.(1991), toluene was accumulated in breast milk, although no developmental toxicity via lactation was observed.
CYCLOHEXANE	In the dosage with parents' weight decrease, or dosage without the statement about general toxicity of parents, the low weight value of the child at the lactation period and an decrease fetal weight are observed, and the influence to the male genitals (atrophia of testis, the spermatic toxicity) was observed (ACGIH (2002), EU-RAR (2004), DFGOT vol.13 (1999)).
HEXANE	It was considered as category 2 since there is description that the organization injury of the testis accompanied by inhibition of spermatogenesis is observed by inhalation exposure to a rat (EHC 122 (1993), DFGOT vol.4 (1992), IRIS (Access on July 2005) and ATSDR (1999)), and in 1000ppm exposure effect is observed in a testis, muscular atrophy (DFGOT vol.4 (1992)) and weight loss (ATSDR (1999)) were also shown.
ACETONE	There is a report that he has no effect on a miscarriage in an epidemiological study (ATSDR, 1994). It is reported of slight developmental toxicity (decrease of embryo weight) in rat high concentration exposure (11000 ppm (20 mg/L)) (EHC, 207 (1998)) and of the decrease of embryo weight and the increase of late embryo abortion rate in mouse high concentration exposure (6600 ppm (15.6 mg/L)) (EHC, 207 (1998)). There is a description that study is still more nearly required, for an animal with humans (EHC). And it is classified into the Category 2 the above thing.
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	Irritation

- Specific target organ toxicity (single exposure)

TOLUENE	Based on the human evidence including "toluene is rapidly absorbed mainly through inhalation and acts on the central nervous system. Toluene causes fatigue, sleepiness, dizziness and mild respiratory irritation at 50–100 ppm, excitement associated with paresthesia and nausea at 200–400 ppm and central nervous system suppression leading to drunkenness, delirium and abnormal gait at 500–800 ppm" (CERI Hazard Data 96–4, 1997) and "irritation to the eyes, nose and pharynx" (EU–RAR No. 30, 2003) and the evidence from animal studies including "anesthesia" (EU–RAR No. 30, 2003).
CYCLOHEXANE	A statement that there is respiratory irritation in humans (ACGIH and (2001), ICSC (J) (1994)), central inhibition, such as nausea, unconsciousness, and reflective loss, occurs and it may die (PATTY (5th, 2001)).
HEXANE	Although there is descriptions in EHC 122 (1993), ACGIH (7th, 2001), DFGOT vol.4 (1992), and PATTY (4th, 1994) referring to confirmation of giddiness, central nervous system depressant, etc. as acute inhalation toxicity in humans, it was judged that these effects were caused by anesthetic actions. Moreover, it was judged as Category 3 because of descriptions in ACGIH (7th, 2001) and PATTY (4th, 1994) referring to confirmation of respiratory irritant caused by inhalation exposure to humans, and of a description in PATTY (4th, 1994) referring to confirmation of anesthetic actions.
ACETONE	Based on the descriptions that irritation in the human throat is caused by 1200ppm exposure (ACGIH (2001)), that irritation is caused in the nasal cavity, throat and trachea by 1190 and 2400mg/m3/6h exposure to humans (ECH 207 (1998)), and that irritation was caused in the throat by 1000ppm/4h exposure (ECH 207 (1998)). So it was set as Category 3 (airway irritation). And the descriptions that a male who drank 200ml fell coma (recovering his consciousness in 12 hours), and that a worker exposed to 12000ppm experienced headache, dizziness, leg weakness and fainting (ACGIH (2001)). So it was also set as Category 3 (anesthetic actions) based on the descriptions that a male who drank 200 ml fell coma, recovering his consciousness in 12 hours, and that a worker exposed to 12000 ppm experienced headache, dizziness, leg weakness and dead faint(ACGIH (2001)).
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
– Specific target organ toxicity (repeated exposure)	
TOLUENE	Based on the human evidence including "Toluene induces drug dependency, and inhalant abuse of toluene causes chronic central nervous system damage including restricted vision, headache associated with nystagmus and hearing loss, tremor, ataxia and amnesia. Cerebral atrophy was found in CT tests, and renal dysfunction manifested as proteinuria and hematuria was also observed (CERI Hazard Data 96–4, 1997), "hearing loss, changes in brain–stem auditory evoked potential" (ATSDR, 2000) and "hepatic toxicity associated with an increase in SGOT, fatty degeneration of hepatic cells and lymphocytic infiltration (EU–RAR No. 30, 2003).
CYCLOHEXANE	In humans, there is no statement of apparent toxicity development by this substance (ACGIH and (2002),EU–RAR (2004))
HEXANE	Based on the description that polyneuropathy (disorder of sensory nerve and motor nerves) is observed in human chronic exposure examples (MOE Risk Assessment The 1st volume (2002), EHC 122 (1993), ACGIH (7th, 2001), DFGOT vol.14 (2000), PATTY (4th, 1994), IRIS (2005), Japan Society for Occupational Health advice (1993), and ATSDR (1999)), target organs were judged to be central nervous systems and peripheral nervous systems, and we categorized it as Category 1.

ACETONE	It was classified into Category 2, since by the examination using volunteers, the significant increase in white corpuscles and an eosinophil and the significant reduction of a phagocytosis of a neutrophil were observed in the exposure group with 500 ppm, 6 hours/day for 6 days (ACGIH (2001)). In the examination using the rat and the mouse, although it was a dose greatly beyond guidance limits, the similar haematological changes like in humans was admitted (SIDS (1999)). Since in other examination using a rat and a mouse , each is over the guidance limits (ACGIH (2001)),(SIDS (1999)) and there is also no example of a report in humans, they were not adopted as a classification basis.
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Aspiration hazard	
TOLUENE	Based on the fact that toluene is a hydrocarbon and has a dynamic viscosity of 0.65 mm ² /s (25degC) (calculated value).
CYCLOHEXANE	"possible to cause chemical pneumonia by misswallowing of the liquid."(ICSC(J), 1999)
HEXANE	Since it is a hydrocarbon and the dynamic viscosity at 40 degrees C is 20.5mm ² /s or less, we classified it as Category 1. There was description of chemical pneumonia by the Aspiration in the rat (DFGOT vol.4 (1992)).
ACETONE	The calculated dynamic viscosity is 0.426mm ² /sec and there was not the animal data of chemical pneumonia, however, it was the ketone of under C13, therefore it was classified into Category 2.
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available

12. Ecological information

A. Aquatic and terrestrial ecotoxicity

- Fish	
TOLUENE	LC50 24 mg/l 96 hr Oncorhynchus mykiss
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	LC50 > 100 mg/l 96 hr
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Shellfish	
TOLUENE	EC50 11.5 mg/l 48 hr Daphnia magna
CYCLOHEXANE	EC50 0.9 mg/l 48 hr
HEXANE	LC50 3.88 mg/l 4 hr
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available
- Birds	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA-TERTIARY-BUTYLPHENOL- FORMALDEHYDE ...	No data available
NEOPRENE	No data available

B. Persistence and degradability

– Persistence	
TOLUENE	log Kow 2.73
CYCLOHEXANE	log Kow 3.4
HEXANE	log Kow 3.9
ACETONE	log Kow –0.24
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	Not applicable
NEOPRENE	No data available
– Resolvability	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
C. Bioaccumulative potential	
– Concentration	
TOLUENE	No data available
CYCLOHEXANE	BCF 129
HEXANE	No data available
ACETONE	No data available
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
– Bio resolvability	
TOLUENE	86 (%) 20 day
CYCLOHEXANE	77 (%) 28 day
HEXANE	100 (%)
ACETONE	No data available
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
D. Mobility in soil	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
E. Other adverse effects	
TOLUENE	No data available
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available

13. Disposal considerations

A. Disposal method	Destroy the product by incineration
B. Disposal precaution	Destroy the product by incineration

14. Transport information

A. UN number	1133
B. UN proper shipping name	ADHESIVES containing flammable liquid
C. Transport hazard class	3
D. Packing group (if applicable)	II
E. Marine pollution (yes/no)	Yes
F. Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises	
– Emergency procedure at fire	F–E
– Emergency procedure at leakages	S–D

15. Regulatory information

A. Industrial Safety and Health Act	
Management harmful agents	TOLUENE, CYCLOHEXANE, HEXANE, ACETONE
Working environment measurement target material (measurement period: 6 months)	TOLUENE, CYCLOHEXANE, HEXANE, ACETONE
Special medical examination the substance (diagnostic period: 12 months)	TOLUENE, CYCLOHEXANE, HEXANE, ACETONE
Exposure limits set material	TOLUENE, CYCLOHEXANE, HEXANE, ACETONE
Establishment of the effluent standard material	HEXANE
B. Toxic Chemical Control Act	
TOLUENE	Toxicant
CYCLOHEXANE	No data available
HEXANE	No data available
ACETONE	No data available
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	No data available
NEOPRENE	No data available
C. Dangerous Material Safety Control Act	The 4th type, the 1st petroleum type
D. Wastes Management Act	Designated Wastes
E. Other requirements in domestic and other countries	
– Domestic regulation	
Persistent Organic Pollutant Control Act	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
– Other countries	
USA(OSHA)	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA(CERCLA)	

TOLUENE	453.599 kg 1000 lb
CYCLOHEXANE	453.599 kg 1000 lb
HEXANE	2267.995 kg 5000 lb
ACETONE	2267.995 kg 5000 lb
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA(EPCRA 302)	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA(EPCRA 304)	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA(EPCRA 313)	
TOLUENE	Applicable.
CYCLOHEXANE	Applicable.
HEXANE	Applicable.
ACETONE	Not Applicable.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA (Rotterdam Convention material)	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA (Stockholm Convention material)	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
USA (Substance Montreal Protocol)	
TOLUENE	Not Applicable.
CYCLOHEXANE	Not Applicable.
HEXANE	Not Applicable.
ACETONE	Not Applicable.
PARA-TERTIARY-BUTYLPHENOL-FORMALDEHYDE ...	Not Applicable.

NEOPRENE	Not Applicable.
EU (Classification)	
TOLUENE	F; R11 Repr. Cat. 3; R63Xn; R48/20–65Xi; R38R67
CYCLOHEXANE	F; R11Xn; R65Xi; R38R67N; R50–53
HEXANE	F; R11 Repr. Cat. 3; R62 Xn; R48/20–65 Xi; R38 R67 N; R51–53
ACETONE	F; R11Xi; R36R66R67
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
EU (Risk Phrases)	
TOLUENE	R11, R38, R48/20, R63, R65, R67
CYCLOHEXANE	R11, R38, R65, R67, R50/53
HEXANE	R11, R38, R48/20, R62, R65, R67, R51/53
ACETONE	R11, R36, R66, R67
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.
EU (Safety Phrases)	
TOLUENE	S2, S36/37, S46, S62
CYCLOHEXANE	S2, S9, S16, S25, S33, S51, S60, S61, S62
HEXANE	S2, S9, S16, S29, S33, S36/37, S61, S62
ACETONE	S2, S9, S16, S26, S46
PARA–TERTIARY–BUTYLPHENOL– FORMALDEHYDE ...	Not Applicable.
NEOPRENE	Not Applicable.

16. Other information

A. Information source and references

TOLUENE

EU–RAR No.30 (2003)(Oral)
ACGIH (7th; 2001)(Dermal)
EU–RAR No.30 (2003)(Inhalation)
HSDB (2005)(Persistence)

CYCLOHEXANE

NLM(Oral)
EU–RAR (2004)(Dermal)
EU–RAR (2004)(Shellfish)
ICSC(Persistence)
EU–RAR (2004)(Bio resolvability)

HEXANE

NLM(Oral)
EHC (1991), DFGOT (2000)(Inhalation)
EHC (1991)(Shellfish)
ICSC(Persistence)

ACETONE

ICSC(Persistence)

PARA–TERTIARY–BUTYLPHENOL–FORMALDEHYDE ...

NEOPRENE

Corporate Solution From Thomson Micromedex(<http://csi.micromedex.com>)(Oral)

B. Issuing date

November 4, 2015

C. Revision number and date

2 / April 25, 2022

D. others