Co-515 DLC®-A

1: Identification

Product identifier: Co-515 DLC®-A

Other means of identification: Chemical mixture

Supplier:

i

NATROCHEM, Inc. P.O. Box 1205

Savannah, GA 31402-1205

912-236-4464

Recommended use: Rubber crosslinking agent

Restrictions on use: Not applicable.

Emergency phone number: CHEMTREC (USA) 800-424-9300 CHEMTREC (Int'l) 202-483-7616

2: Hazard(s) identification

GHS classification: Skin sensitization – Category 1

Chronic aquatic toxicity – Category 2

Carcinogenicity - Category 2

GHS label elements

Signal word:

Symbol(s):







Hazard statements: May cause an allergic skin reaction

Toxic to aquatic life with long lasting effects

Suspected of causing cancer.

Hazards not otherwise

classified:

May form combustible dust concentrations in the air.

Precautionary statements:

Prevention: Avoid breathing dust/vapours.

Do not get in eyes, on skin, or on clothing.

Do not eat, drink or smoke when using this product.

Avoid release to the environment.

Response: IF ON SKIN (or hair): Wash with plenty of soap and water.

IF INHALED: Remove person to fresh air and keep comfortable for

breathing.

IF IN EYES: Rinse cautiously with water for several minutes.

Remove contact lenses if present and easy to do – continue rinsing. IF exposed or concerned: Call a POISON CENTER/ doctor if you feel

unwell.

In case of fire: Use water spray, CO₂, foam, or dry chemical to

extinguish.

Storage: Store in a dry place. Store in a closed container.

Disposal: Dispose of contents/container in accordance with applicable

regulations.

Supplemental information: Possible cross-sensitization with other acrylates and methacrylates.

3: Composition

Substance/mixture: Mixture

Ingredient	Synonyms	CAS number	Concentration (%)
2-propenoic acid, 2-methyl-, 2-	Trimethylolpropane	3290-92-4	55-65
ethyl-2-[[(2-methyl-1-oxo-2-	trimethacrylate, TMPTMA		
propenyl)oxy]methyl]-1,3-			
propanediyl ester			
2-propenoic acid, 2-ethyl-2-[[(1-	Trimethylolpropane	15625-89-5	0-10
oxo-2-propenyl)oxy]methyl]-	triacrylate, TMPTA		
1,3-propanediyl ester			
Benzeneamine, N-nitroso-N-	N-nitrosodiphenylamine	86-30-6	0-2
phenyl			
Silica, amorphous, precipitated,		112926-00-8	26-30
and gel			

Contains no detectable crystalline silica (detection limit <0.01% by weight)

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

4: First-aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM, OR PHYSICIAN immediately; have SDS information available. Never give anything by mouth to an unconscious or convulsing person.

Description of necessary first aid measures

Eye contact: Check for and remove any contact lenses. Immediately flush eyes

with running water for at least 15 minutes, keeping eyelids open.

Seek immediate medical attention.

Inhalation: Remove to fresh air. Keep person warm and at rest. If not

breathing, if breathing is irregular, or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.

Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly

with soap and water or use recognized skin cleanser. Do NOT use

solvents or thinners.

Ingestion: If swallowed, seek medical advice immediately and show this

container or label. Keep person warm and at rest. Do NOT induce

vomiting.

Most important symptoms/effects, acute and delayed.

Potential acute health effects

Eye contact: No significant irritation expected other than possible mechanical

irritation.

Inhalation: Exposure to airborne concentrations above statutory or

recommended exposure limits may cause irritation of the nose,

throat, and lungs.

Skin contact: Prolonged or repeated contact may dry skin and cause irritation.

Ingestion: No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact: Adverse symptoms may include the following:

Irritation Redness

Inhalation: Adverse symptoms may include the following:

Coughing

Respiratory tract irritation

Skin contact: Adverse symptoms may include the following:

Dryness

Ingestion: No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist

immediately if large quantities have been ingested or inhaled.

Specific treatments: No specific treatment.

Protection of first-aiders: No action shall be taken involving any personal risk or without

suitable training.

See toxicological information (Section 11)

5: Fire-fighting measures

Extinguishing media

Suitable extinguishing

Use water spray, CO₂, foam, or dry chemical to extinguish.

media:

Unsuitable extinguishing

Do not use a solid water stream as it may scatter and spread fire.

media:

Specific hazards arising from

the chemical:

Product forms a slippery surface when combined with water.

Hazardous thermal In the event of a fire, hazardous decomposition products may

decomposition products: include:

Carbon monoxide Carbon dioxide Acrylates Methacrylates Nitogen oxides

Other unidentified organic compounds

Special protective actions for

firefighters:

No action shall be taken involving any personal risk or without

proper training.

Special protective Firefighters and others who may be exposed to products of combustion should wear full firefighting turn out gear (full bunker

gear) and self-contained breathing apparatus (SCBA) operated in pressure-demand mode (MSHA/NIOSH approved or equivalent).

6: Accidental release measures

Personal precautions, protective equipment, and emergency procedures

For non-emergencyKeep unnecessary and unprotected personnel from entering. Do **personnel:** not touch or walk through spilled material. Product forms slippery

not touch or walk through spilled material. Product forms slippery surface when combined with water. No action shall be taken

involving any personal risk or without suitable training.

For emergency responders: If specialized clothing is required to deal with the spillage, take

note of any information in **Section 8** on suitable and unsuitable materials. See also the information immediately above in "For non-

emergency personnel".

Environmental precautions: Avoid release to sewers, waterways, soil, or air. Inform the

relevant authorities if the product has caused environmental

pollution (sewers, waterways, soil, or air).

Methods and materials for containment and cleaning up

Small spill: Avoid generating dust. Vacuum or sweep up material and place in a

designated, labeled waste container.

Large spill: Avoid generating dust. Vacuum or sweep up material and place in a

designated, labeled waste container.

See Section 1 for emergency contact information.

See Section 8 for information on appropriate personal protective equipment.

See Section 13 for additional waste treatment information.

7: Handling and storage

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8).

Advice on general Eating, drinking, and smoking should be prohibited in areas where occupational hygiene: this material is handled, stored, and processed. Workers should

wash hands and face before eating, drinking, and smoking. Remove contaminated clothing and protective equipment before entering eating areas. When transferring material into flammable solvents, use proper grounding to avoid electrical sparks. Avoid alteration of product properties before use. Calcining (which may result in crystalline silica formation) or mixing with additives may alter toxicological properties.

Conditions for safe storage, including any incompatibilities:

See also **Section 8** for additional information on hygiene measures. Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool, and well-ventilated area away from incompatible materials (see **Section 10**) and food and drink. Keep container tightly closed and sealed until ready for use. Do not store in unlabeled containers. Incompatible materials include: strong oxidizing agents, strong reducing agents, free radical generators, inert gas, oxygen scavengers, peroxides.

8: Exposure controls/personal protection

Control parameters

Occupational exposure limits

occupational exposure mints					
Ingredient	OSHA PEL	ACGIH TLV	NIOSH REL		
2-propenoic acid, 2-methyl-, 2-ethyl-2-[[(2-methyl-1-oxo- 2-propenyl)oxy]methyl]-1,3- propanediyl ester	1 mg/m ³ TWA	Not available.	Not available.		
2-propenoic acid, 2-ethyl-2- [[(1-oxo-2- propenyl)oxy]methyl]-1,3- propanediyl ester	1 mg/m ³ TWA	Not available.	Not available.		

Recommended monitoring procedures:

If this product contains ingredients with exposure limits, personal, workplace atmosphere, or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Appropriate engineering controls:

Environmental exposure controls:

Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Emissions from ventilation or work process equipment should be checked to ensure that they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters, or engineering modifications to process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures: Wash hands, forearms, and face thoroughly after handling

chemical products, before eating, smoking, and using the lavatory, and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be

used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases, or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: splash

goggles.

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved

standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. When handling hot material, wear heat-resistant gloves that are able to

withstand the temperature of molten product.

Body protection: Personal protective equipment for the body should be selected

based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection: Appropriate footwear and any additional skin protection measures

should be selected based on the task being performed and the risks involved and should be approved by a specialist before

handling this product.

Respiratory protection: Respirator selection must be based on known or anticipated

exposure levels, the hazards of the product and the safe working

limits of the selected respirator. If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, airpurifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.

9: Physical and chemical properties

Appearance

Physical state: Powder, solid, or granular solid.

Color: Tan to brown Odor: Acrylic-like. Odor threshold: Not available. pH: Not available. Melting/freezing point: Not available. **Boiling point and range:** Not available. Flash point: Not available. **Evaporation rate:** Not available. Flammability: Not available. **Flammability or explosive** Not available.

limits:

Vapor pressure:

Vapor density:

Relative density:

Solubility:

Partition coefficient: n
Not available.

Not available.

Not available.

octanol/water:

Auto-ignition temperature: Not available.

Decomposition temperature: Not available.

Viscosity: Not applicable.

10: Stability and reactivity

Reactivity: No specific test data related to reactivity available for this product

or its ingredients.

Chemical stability: This product is stable under normal and anticipated storage,

handling, and processing considtions; however, this material can

undergo hazardous polymerization.

Possibility of hazardous Hazardous polymerization may occur. Polymerization is exothermic

reactions: and can degenerate into an uncontrolled reaction.

Conditions to avoid: High temperature (>800°C) treatment (calcining), which may result

in crystalline silica formation.

Avoid alteration of product properties before use. Calcining or

mixing with additives may alter toxicological properties.

Avoid generating dust.

This material polymerizes exothermically I nthe presence of heat, contamination, oxygen-free atmosphere, free radicals, peroxides,

and inhibitor depletion, liberating heat.

Avoid direct sunlight.

Do NOT expose to UV light.

Refer to protective measures listed in **Sections 7 and 8**.

Incompatible materials: Reactive or incompatible with the following materials:

Acids

Oxidizing materials Strong alkalis

Strong reducing agents Free radical generators

Inery gas

Oxygen scavenger

Peroxides

Hazardous decomposition

products:

In the event of a fire, hazardous decomposition products may

include:

Carbon monoxide Carbon dioxide Acrylates Methacrylates Nitogen oxides

Other unidentified organic compounds

11: Toxicological information

Information on toxicological effects

Acute toxicity

Conclusion/summary: No known significant effects or critical hazards.

Ingredient	Result	Species	Dose	Exposure
2-propenoic acid, 2-	LD ₅₀ dermal	Rabbit	>5000 mg/kg	-
methyl-, 2-ethyl-2-[[(2-	LC ₀ inhalation	Rat	Saturated	8 h
methyl-1-oxo-2-			vapour	
propenyl)oxy]methyl]-				
1,3-propanediyl ester				
2-propenoic acid, 2-ethyl-				
2-[[(1-oxo-2-				
propenyl)oxy]methyl]-				
1,3-propanediyl ester				
2-propenoic acid, 2-	LD ₅₀ dermal	Rabbit	5170 mg/kg	-
methyl-, 2-ethyl-2-[[(2-	LD ₅₀ dermal	Rat	>2000 mg/kg	-
methyl-1-oxo-2-	LC ₀ inhalation	Rat	>0.55mg/L	6 h
propenyl)oxy]methyl]-				
1,3-propanediyl ester				
2-propenoic acid, 2-ethyl-				
2-[[(1-oxo-2-				
propenyl)oxy]methyl]-				
1,3-propanediyl ester				
2-propenoic acid, 2-	LD ₅₀ dermal	Rabbit	>7940 mg/kg	-
methyl-, 2-ethyl-2-[[(2-				
methyl-1-oxo-2-				
propenyl)oxy]methyl]-				
1,3-propanediyl ester				

Irritation/corrosion

Conclusion/summary

Skin: TMPTMA: Causes mild skin irritation – Rabbit, 4-6 h. Causes skin

irritation – Rabbit, 5 d repeated exposure.

TMPTA: Causes mild skin irritation – Rabbit, 4 h (Irritation index

2.2-3.8/8)

Eyes: TMPTMA: Causes mild eye irritation – Rabbit, 0-8.1/110

TMPTA: Causes serious eye irritation – Rabbit, 44/110 N-nitrosodiphenylamine: Causes mild eye irritation - Rabbit

Respiratory: No known significant effects or critical hazards.

Sensitization

Conclusion/summary:

Skin: TMPTMA: Not a sensitizer – Guinea pig maxmisation test. Both

positive and negative responses have been recorded. Possible cross sensitization with other acrylates and methacrylates.

TMPTA: May cause an allergic skin reaction, repeated skin exposure. Guinea pig – skin allergy was observed (strong

sensitizer).

Respiratory:

No known significant effects or critical hazards.

Mutagenicity:

Conclusion/summary:

TMPTMA: in vitro — No genetic changes were observed in laboratory tests using bacteria, yeast. Both positive and negative responses were observed in laboratory tests using animal cells, human cells. In vivo — No genetic changes were observed in laboratory tests using rats, mice.

TMPTA: in vitro – both positive and equivocal responses were observed in laboratory tests using bacteria. Genetic changes were observed in laboratory tests using animal cells. In vivo – No genetic changes were observed in laboratory tests using mice. N-nitrosodiphenylamine: in vitro – Both positive and negative changes were observed in laboratory tests using bacteria, animal cells. In vivo – No genetic changes were observed in laboratory tests using rats, mice. An equivocal response has been reported in a test using fruit flies.

Carcinogenicity

Conclusion/summary: TMPTMA: Chronic dermal administration to mouse: no increase in

tumour incidence was reported.

N-nitrosodiphenylamine: Chronic dietary administration to mouse: no increase in tumour incidence was reported. Chronic dietary administration to rat: increase in tumour incidence was reported

(urinary bladder).

Classification

Ingredient	OSHA	IARC	NTP
Silica, amorphous,	-	3	-
precipitated, and gel			
N-nitrosodiphenylamine	-	3	-

Carcinogen classification code:

IARC: 1, 2A, 2B, 3, 4

NTP: [Known/Reasonably anticipated] to be a human carcinogen

OSHA: +

Not listed/regulated: -

Reproductive toxicity

Conclusion/summary: TMPTMA: Oral, rat, no toxicity to reproduction.

Teratogenicity

Conclusion/summary: No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

<u>Target organs</u> Contains material which may cause damage to the following

organs: upper respiratory tract, eyes.

Aspiration hazard

Not available.

Information on the likely routes

Routes of entry anticipated: oral, dermal, inhalation.

of exposure:

Potential acute health effects

Eye contact: No significant irritation expected other than possible mechanical

irritation.

Inhalation: Exposure to airborne concentrations above statutory or

recommended exposure limits may cause irritation of the nose,

throat, and lungs.

Skin contact: Prolonged or repeated contact may dry skin and cause irritation.

Ingestion: No known significant effects or critical hazards.

Symptoms related to the physical, chemical, and toxicological characteristics

Eye contact: Adverse symptoms may include the following:

Irritation

Redness

Inhalation: Adverse symptoms may include the following:

Coughing

Respiratory tract irritation

Skin contact: Adverse symptoms may include the following:

Dryness

Ingestion: No specific data.

Delayed and immediate effects and also chronic effects from short- and longterm exposure

Conclusion/summary: An epidemiological study was conducted which included 165

precipitated silica workers who had been exposed an average time of 8.6 years. Of these 165 workers, 44 had been exposed for an average of 18 years. No adverse effects were noted in complete medical examinations (including chest roentgenograms) of these workers. Pulmonary function decrements were correlated only with smoking and age but not with the degree or duration of dust exposures. Laboratory studies have also been conducted in small animals via inhalation of levels of precipitated silica dust of up to 126 mg/m³ per periods from six months to two years. Although precipitated silica was temporarily deposited in animals' lungs, most of the deposited material was cleared soon after the dust exposure ended. The results of all studies performed by, or known to, PPG indicated a very low order of pulmonary activity for

synthetic precipitated silicas. PPG recommends that persons with breathing problems or lung disease should not work in dusty areas unless a physician approves and certifies their fitness to wear

respiratory protection.

Short-term exposure

Potential immediate No significant irritation expected other than possible mechanical

effects irritation.

Potential delayed effects Prolonged or repeated contact may dry skin and cause irritation.

Long-term exposure

Potential immediate Repeated or prolonged inhalation of dust may lead to chronic

effects respiratory irritation.

Potential delayed effects Repeated or prolonged inhalation of dust may lead to chronic

respiratory irritation.

Potential chronic health effects

General:

No known significant effects or critical hazards.

No known significant effects or critical hazards.

Mutagenicity:
No known significant effects or critical hazards.

Teratogenicity:
No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Oral ATE: > 5000 mg/kg

12: Ecological information

Toxicity

Ingredient	Result	Species	Exposure
Silica, amorphous,	NOEC > 1000 ppm	Daphnia – daphnia	24 h
precipitated, and gel		magna	
	Acute NOEC > 10000 ppm	Fish	96 h static
	fresh water		
	Acute NOEC > 10000 ppm	Fish – brachydanio rerio	4 d static
TMPTMA	LC50 2 mg/L	Fish – oncorhynchus mykiss	96 h
	EC50 9.22 mg/L	Daphnia – <i>daphnia</i> <i>magna</i>	48 h
	EC50 1.11-3.88 mg/L	Algae –	72 h
		pseudokirchneriella	
		subcapitata	
	EC50 > 1000 mg/L	Activated sludge	3 h
	NOEC 0.138 mg/L	Fish – pimephales	32 d
		promelas	
TMPTA	LL50 1.47 mg/L	Fish – leuciscus idus	96 h
	EC50 19.9 mg/L	Daphnia – <i>daphnia</i>	48 h
		magna	
	EC50 4.86 mg/L	Algae – desmodesmus subspicatus	96 h
	EC20 625 mg/L	Activated sludge	30 m
N-	LC50 5.8 mg/L	Fish – <i>lepomis</i>	96 h
nitrosodiphenylamine		macrochirus	
	EC50 7.8 mg/L	Daphnia – <i>daphnia</i>	48 h
		magna	
	ErC50 > 4 mg/L	Algae - raphidocelus	72 h
		subcapitata	
	NOEC 0.075 mg/L	Daphnia – <i>daphnia</i>	21 d
		magna	
	ErC10 2.2 mg/L	Algae - raphidocelus	72 h
		subcapitata	

Persistence and degradability

Ingredient	Aquatic half-life	Photolysis	Biodegradability
Silica, amorphous, precipitated, and gel	-	-	Not readily
TMPTMA	-	-	Not readily (29-53%, 28 d)
TMPTA	-	-	Readily (86%, 28 d)
N- nitrosodiphenylamine	-	-	Readily (98%, 7 d)

Bioaccumulative potential

Ingredient	LogPow	BCF	Potential
Silica, amorphous,	-	0	low
precipitated, and gel			
TMPTMA	2.7-4.2	-	-
TMPTA	0.67	-	-
N-	2.57-3.13	-	low
nitrosodiphenylamine			

Mobility in soil

Soil/water partition Not available.

coefficient (Koc):

Other adverse effects: No known significant effects or critical hazards.

13: Disposal considerations

Disposal methods: The generation of waste should be avoided or minimized wherever

possible. Disposal of this product, solutions, and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local

authority requirements.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Refer to Sections 6, 7, and 8 for additional information on accidental release measures, handling and storage, and exposure controls.

14: Transport information

	DOT	IMDG	IATA
UN number	UN3077	UN3077	UN3077
UN proper shipping name	JN proper shipping name Environmentally		Environmentally
	hazardous substance,	hazardous substance,	hazardous substance,
	solid, n.o.s.	solid, n.o.s.	solid, n.o.s.
	(Propylidynetrimethyl	(Propylidynetrimethyl	(Propylidynetrimethyl
	trimethacrylate)	trimethacrylate)	trimethacrylate)
Transport hazard class(es)	9	9	9
Packing group	Ш	III	Ш
Environmental hazards	mental hazards Yes		Yes
Marine pollutant substances	Yes	Yes	Yes
Additional information	dditional information -		-

Special precautions for user: Transport within user's premises: always transport in closed

containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident

or spillage.

Transport in bulk according

Not available.

to Annex II of MARPOL 73/78 and the IBC code:

15: Regulatory information

Inventory status

United States inventory (TSCA All components are listed or exempted.

8b):

Australia inventory (AICS):
Canada inventory (DSL):
China inventory (IECSC):
All components are listed or exempted.

Japan inventory (ENCS): Please contact your supplier for information on the inventory

status of this material.

Korea inventory (KECI): All components are listed or exempted. **New Zealand inventory** All components are listed or exempted.

(NZIoC):

United States

US Federal regulations:

SARA Title III

Section 302 – Extremely Hazardous Chemicals:

The components in this product are either not SARA Section 302 regulated or are regulated but present in negligible concentrations.

Section 311/312 – Hazard Categories:

Reactivity hazard, acute health hazard, chronic health hazard.

Section 313 – Toxic Chemicals:

N-nitrosodiphenylamine (86-30-6), 1.0% de minimis, 25k lb mfring, 10k lb other

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – Reportable Quantity (RQ)

N-nitrosodiphenylamine (86-30-6): 100 lb

US State regulations:

ob beate regulations				
Ingredient	NJ RTK	MA RTK	PN RTK	CA Prop. 65
Silica, amorphous,	Listed	-	-	-
precipitate, and gel				
TMPTMA	-	-	Listed	-
TMPTA	-	-	Listed	-
N-nitrosodiphenylamine	Listed	-	Listed	-
Benzene, -methyl	-	-	-	Listed

16: Other information

Hazardous Material Identification System (USA)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1901.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the Nation Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J.J.Keller 800-327-6868.

The customer is responsible for determining the PPE code for this material.

Key to abbreviations:

ATE Acute toxicity estimate
BCF Bioconcentration factor

GHS Globally Harmonized System of classification and labeling of chemicals

IATA International Air Transport Association

IBC Intermediate bulk container

IMDG International Maritime Dangerous Goods

LogPow Logarithm of the octanol/water partition coefficient

MARPOL 73/78 International convention for the Prevention of Pollution from Ships,

1973, as modified by the Protocol of 1978. (MARPOL = marine pollution)

UN United Nations

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^{* -} chronic effects