

MATERIAL SAFETY DATA SHEET

ALSAN TRAFIK HP 515 PART A

Offerte en français

WHMIS	PROTECTIVE CLOTHING	TRANSPORT OF DANGEROUS GOODS
	  	 PAINT Class 3 UN1263 P.G.: II

SECTION I: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Use: Bi-component waterproofing polyurethane primer.

Formula number: 888.1

Manufacturer / Distributors :

Soprema Canada
 1675, Haggerty Street
 Drummondville (Quebec) J2C 5P7
 CANADA
 Tel. : 819 478-8163

Soprema inc.
 44955, Yale Road West
 Chilliwack (C.-B.) V2R 4H3
 CANADA
 Tel. : 604 793-7100

Soprema USA
 310, Quadral Drive
 Wadsworth (Ohio) 44281
 UNITED STATES
 Tel. : 1 800 356-3521

Soprema USA
 12251 Seaway Road
 Gulfport (Mississippi) 39507
 UNITED STATES
 Tel. : 228 701-1900

In case of emergency:

SOPREMA (8:00am to 5:00pm) : 1 800 567-1492 CANUTEC (Canada) (24h.) : 613 996-6666

CHEMTREC (USA) (24h.) : 1 800 424-9300

EMERGENCY OVERVIEW

Clear yellowish liquid with low odour. **CAUTION!** This product and its vapours are flammable. The vapours are heavier than air and may spread long distances. Distant ignition and flash back are possible. Irritating and/or toxic gases or fumes may be generated by thermal decomposition or combustion. May cause skin, eye and respiratory tract irritation. May be harmful or fatal if swallowed. Ingestion of the product can cause severe lung injury when aspirated. Inhalation of high concentrations of this product may cause central nervous system (CNS) depression (headache, nausea, dizziness, drowsiness, incoordination and unconsciousness).

SECTION II: COMPOSITION AND INFORMATION ON DANGEROUS INGREDIENTS

NAME	CAS #	% WEIGHT	EXPOSURE LIMIT (ACGIH)	
			TLV-TWA	TLV-STEL
Castor oil	8001-79-4	60-100	Not established	Not established
tert-Butyl acetate	540-88-5	5-10	200 ppm	Not established
Alkoxylated ethylene diamine	26316-40-5	1-5	Not established	Not established

SECTION III: POTENTIAL HEALTH EFFECTS

Effects of Short-Term (Acute) Exposure

INHALATION

Castor oil: Castor oil does not form a vapour at room temperature. Therefore, it must be heated or misted before inhalation exposure would occur. Health effects following inhalation exposure are not expected, due to the overall low toxicity of castor oil. There is no human or animal information available. (1)

tert-Butyl acetate: The vapour is probably irritating to the nose and throat. Exposures to high concentrations can probably cause signs of CNS depression including headache, dizziness, nausea and unconsciousness. There is no specific information available for tert-butyl acetate, but effects would probably be like those observed in animals and humans following exposure to other butyl acetates. (1)

Alkoxylated ethylene diamine: No known significant effects or critical hazards. (2)

SKIN CONTACT

Castor oil: Castor oil is not irritating or a mild irritant, based on animal and human information. Application of 50 mL of castor oil, under a patch for 48 hours, was mildly irritating to humans. Castor oil is not expected to produce harmful effects if absorbed through the skin. (1)

tert-Butyl acetate: The liquid may be a mild to moderate skin irritant, based on comparison to related butyl acetates. There is no human or animal information available for tert-butyl acetate. (1)

Alkoxylated ethylene diamine: Slightly irritating to skin. (2)

EYE CONTACT

Castor oil: Castor oil is not irritating or a mild irritant, based on animal information. It is sometimes used as an eye ointment. (1)

tert-Butyl acetate: The liquid can probably cause moderate to severe eye irritation, based on comparison to related acetates. The vapour can probably cause mild to severe eye irritation, depending on the concentration. There is no specific information available for tert-butyl acetate. (1)

Alkoxylated ethylene diamine: Slightly irritating to eyes. (2)

INGESTION

Castor oil: Castor oil is not expected to produce significant harmful effects if accidentally ingested, based on animal toxicity information and experience gained through the use of castor oil as a laxative in humans. A single oral dose is considered safe. Ingestion of large doses can cause nausea, vomiting, stomach cramps and diarrhoea. Ingestion is not a typical route of occupational exposure. (1)

tert-Butyl acetate: Related butyl acetates are not very toxic by ingestion. Like other butyl acetates, tert-butyl acetate may be irritating to the mouth and throat. Ingestion of large amounts may produce signs of CNS depression, like those described for "Inhalation" above. Ingestion is not a typical route of occupational exposure. (1)

Alkoxylated ethylene diamine: Slightly hazardous in case of ingestion. (2)

SKIN SENSITIZATION

Castor oil: There is insufficient information available to determine if castor oil is an occupational sensitizer. There are several case reports of dermatitis and occasional facial swelling from the use of lipsticks, where castor oil is believed to be the cause. There is no animal information available. (1)

tert-Butyl acetate: No information available. (1)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

CARCINOGENICITY

Castor oil: There is no human or animal information available. The International Agency for Research on Cancer (IARC) has not evaluated the carcinogenicity of this chemical. The American Conference of Governmental Industrial Hygienists (ACGIH) has no listing for this chemical. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

tert-Butyl acetate: There is no human or animal information available. Probably not carcinogenic. The International Agency for Research on Cancer (IARC) has not evaluated the carcinogenicity of this chemical. The American conference of Governmental Industrial Hygienists (ACGIH) has not assigned a carcinogenicity designation to this chemical. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY

Castor oil: No human or animal information is available. (1)

tert-Butyl acetate: See section XI.

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

REPRODUCTIVE TOXICITY

Castor oil: There is no human information available. In the one animal test located, ingestion of castor oil did not cause changes in sperm counts or motility or in the female fertility cycle. (1)

tert-Butyl acetate: See section XI.

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

MUTAGENICITY

Castor oil: There is no human information available. Castor oil is not expected to be mutagenic. Negative results have been obtained in a test using live animals, in cultured mammalian cells and in bacteria. (1)

tert-Butyl acetate: See section XI.

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

TOXICOLOGICALLY SYNERGISTIC MATERIALS

Castor oil: No information is available. (1)

tert-Butyl acetate: No information is available. (1)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

POTENTIAL FOR ACCUMULATION

Castor oil: Does not accumulate. (1)

tert-Butyl acetate: Probably does not accumulate. Studies suggest that tert-butyl acetate is rapidly broken down in the body to acetic acid and tert-butanol and eliminated in the urine. Another study shows that tert-butyl acetate is more slowly eliminated from blood than n-butyl acetate. (1)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

SKIN CONTACT

Remove contaminated clothing. Wash thoroughly with soap and water. If irritation persists, get medical attention.

EYE CONTACT

Flush thoroughly with water for at least 20 minutes. Get medical attention immediately.

INHALATION

In case of gas or vapour inhalation, move victim to fresh air. If breathing is difficult, give oxygen. If breathing stops, give respiratory assistance. Obtain medical assistance.

SWALLOWING

Do not induce vomiting. Immediately contact local poison control centre. Should vomiting occur, be sure to keep the victim's head below hips to avoid aspiration of vomit into the lungs. Maintain the victim at rest and obtain immediate medical attention.

SECTION V: FIRE FIGHTING MEASURES

FLAMMABILITY: Flammable liquid, Class 1B (NFPA)
EXPLOSION DATA: Sensitivity to mechanical impact: No
 Sensitivity to static charge: Probably will not accumulate static charge, since acetates have high electrical conductivities. Vapours in the flammable range may be ignited by a static discharge of sufficient energy.

FLASH POINT: 15.5°C (tert-Butyl acetate)
AUTO-IGNITION TEMPERATURE: Not available
FLAMMABILITY LIMITS IN AIR: 1.3% - 7.3% (tert-Butyl acetate)

FIRE AND EXPLOSION HAZARDS

This product and its vapours are easily ignited by heat, sparks or flames. Vapours may form explosive mixtures with air. Vapours are heavier than air and may travel a considerable distance to a source of ignition and flash back to a leak or open container. The product may ignite on contact with strong oxidizing agents, strong acids and strong bases. Do not cut, puncture or weld empty containers.

COMBUSTION PRODUCTS

Carbon oxides (CO, CO₂) and nitrogen oxides. Irritating and/or toxic gases or fumes may be generated by thermal decomposition or combustion.

FIRE FIGHTING INSTRUCTIONS

Evacuate area. Wear self-contained breathing apparatus and appropriate protective clothing in accordance with standards. Approach fire from upwind and fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Always stay away from containers because of the high risk of explosion. Stop leak before attempting to put out the fire. If leak cannot be stopped, and if there is no risk to the surrounding area, let the fire burn itself out. Move containers from fire area if this can be done without risk. Cool containers with flooding quantities of water until well after fire is out.

MEANS OF EXTINCTION

"Alcohol" foam or polymer foam, dry chemical powder, CO₂, sand. Use of water spray when fighting fire may be inefficient because of the low flash point of the product.

SECTION VI: ACCIDENTAL RELEASE MEASURES**RELEASE OR SPILL**

Ventilate area. Wear appropriate protective equipment during cleanup. Eliminate all ignition sources. Shut off source of leak if it can be done without risk. Contain the spill. Absorb with inert material such as sand or earth. Sweep or shovel into containers with lids, use clean non-sparkling tools (sp.: plastic) to collect absorbed material. Cover and remove to appropriate well-ventilated area until disposal. Wash spill area with soap and water. Prevent entry into waterways, sewers or basements. Dispose of this product according to local environmental regulations.

SECTION VII: HANDLING AND STORAGE

HANDLING

This product and its vapours are extremely flammable and toxic. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing mist, vapour or dust. Wash thoroughly after handling. Before handling, it is very important that ventilation controls are operating and protective equipment requirements are being followed. People working with this product would be properly trained regarding its hazards and its safe use. Eliminate all ignition sources (e.g. sparks, open flames, hot surfaces). Keep away from heat. Ground transfer containers to avoid static accumulation. Tightly reseal all partially used containers. Do not cut, puncture or weld containers.

STORAGE

Store in a cool well-ventilated area out of direct sunlight and away from heat and ignition sources. Keep storage areas clear of combustible materials. No smoking near storage area. Store away from incompatible materials. Store the product according to occupational health and safety regulations and fire and building codes. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Have appropriate fire extinguishers and spill clean-up equipment near storage area. Inspect all containers to make sure they are properly labelled.

SECTION VIII: EXPOSURE CONTROLS / PERSONAL PROTECTION

HANDS: Wear gloves in polyethylene or ethylene vinyl alcohol. For short periods of time, you can use butyl rubber, natural rubber, neoprene rubber, nitrile rubber, polyvinyl alcohol, polyvinyl chloride and Viton.

RESPIRATORY: If the TLV is exceeded, if use is performed in a poorly ventilated confined area, use an approved respirator in accordance with standards (chemical cartridge respirator with organic vapour cartridge(s)).

EYES: Wear chemical safety goggles in accordance with standards.

OTHERS: Eye bath and safety shower.

CONTROL OF VAPOURS: Local exhaust is needed to control vapour and dust level to below recommended limits

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOUR AND APPEARANCE:	Clear yellowish with low odour
ODOUR THRESHOLD:	Not available
VAPOUR DENSITY (air = 1):	Heavier than air
EVAPORATION RATE (Butyl acetate = 1):	Not available
BOILING POINT (760 mm Hg):	Not available
FREEZING POINT:	Not available
SPECIFIC GRAVITY (H₂O = 1):	0.954 kg/L
SOLUBILITY IN WATER (20°C):	Not soluble
VOLATILE ORGANIC COMPOUND (V.O.C.):	0 g/L
VISCOSITY:	200-350 cP (25°C)

SECTION X: STABILITY AND REACTIVITY

STABILITY: This material is stable.

CONDITIONS OF REACTIVITY: Avoid excessive heat.

INCOMPATIBILITY: Strong acids, strong bases, strong oxidizing agents and potassium tert-butoxide.

HAZARDOUS DECOMPOSITION PRODUCTS: tert-butanol. During a fire, irritating/toxic gases, such as carbon monoxide, carbon dioxide and other toxic may be formed, depending on fire conditions

CONDITIONS TO AVOID: Open flames, sparks, electrostatic discharge, heat and other ignition sources prolonged exposure to direct sunlight and moisture.

HAZARDOUS POLYMERISATION: None.

SECTION XI: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA

tert-Butyl acetate: (2)

LC₅₀ (male rat): 4 211 ppm (6-hour exposure)

LD₅₀ (oral, rat): 4 500 mg/kg

LD₅₀ (dermal, rabbit): 2 000 mg/kg

Alkoxylated ethylene diamine: (2)

LD₅₀ (oral, rat): > 5 000 mg/kg

Effects of Short-Term (Acute) Exposure

INHALATION

tert-Butyl acetate: High vapour concentrations may cause CNS stimulation (increased activity, shaking, tremors) and/or depression (fatigue, dizziness, and possibly loss of concentration, with collapse, coma and death in case of severe over-exposure). (2)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

EYE IRRITATION

Castor oil: Castor oil is either not irritating or a mild irritant. (1)

tert-Butyl acetate: Moderate eye irritant. Effects of eye irritation are reversible. (2)

Alkoxylated ethylene diamine: Slightly irritating to eyes. (2)

SKIN CONTACT

Castor oil: Castor oil is probably not irritating or a mild irritant. (1)

tert-Butyl acetate: No systemic toxicity is expected from acute dermal exposure. There is no data to indicate whether this substance is absorbed through the skin. Slight skin irritant. (2)

Alkoxylated ethylene diamine: Harmful in contact with skin. Slightly irritating to skin. (2)

INGESTION

tert-Butyl acetate: High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure). (2)

Alkoxylated ethylene diamine: Slightly hazardous in case of ingestion. (2)

Effects of Long-Term (Chronic) Exposure

CARCINOGENICITY

tert-Butyl acetate: Specific data not available. tert-Butanol, the primary metabolite of tert-butyl acetate, is an animal carcinogen. In a drinking water study, tert-butanol induced benign kidney tumours in male rats via an α -2u-globulin mode of action, a tumour mechanism not relevant to humans. In female mice, there was an increase incidence of benign thyroids tumours, a tumour mechanism that most likely is not relevant to humans. (2)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

TERATOGENOCITY, EMBRYOTOXICITY, FETOTOXICITY

tert-Butyl acetate: This substance is not a developmental toxicant. It did not cause maternal toxicity and no embryo/foetal toxicity or developmental abnormalities were observed in the offspring of animals following inhalation exposures of 1 600 ppm. (2)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

MUTAGENICITY

Castor oil: The available information suggests that castor oil is not mutagenic. (1)

tert-Butyl acetate: Negative for mutagenicity both in vitro and in vivo tests. (2)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

SKIN SENSITIZATION

tert-Butyl acetate: Not expected to cause sensitization by skin contact. (2)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

REPRODUCTIVE TOXICITY

Castor oil: The limited information available suggests that castor oil is not harmful to reproduction. (1)

tert-Butyl acetate: This substance is not toxic to reproduction. The reproductive toxicity of tert-butyl acetate has been investigated in rats via the inhalation route. There were no adverse effects on reproductive performance or sperm number or quality at 1 600 ppm, the highest exposure level tested. In addition, no gross or histopathologic effects were observed in the reproductive organs of male and female rats or mice exposed at 1 600 ppm for 90 days in a repeat-exposure toxicity study conducted via inhalation and there was no adverse effect on estrous cycle length in mice. (2)

Alkoxylated ethylene diamine: No significant effects or critical hazards. (2)

SECTION XII: ECOLOGICAL INFORMATION

ENVIRONMENTAL EFFECTS

Do not allow product or runoff from fire control to enter grounds, basements, storm or sanitary sewers, lakes, rivers, streams or public waterways. Block off drains and ditches. Provincial and federal regulations may require that environmental and / or agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities. May be harmful to aquatic life.

SECTION XIII: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

This product is considered as dangerous material. Consult local, state, provincial or territory authorities to know disposal methods. This material is also known as dangerous waste by RCRA (USA); disposal should follow EPA regulations.

SECTION XIV: TRANSPORT INFORMATION

CLASSIFICATION (TDG and DOT): Class 3

IDENTIFICATION NUMBER: UN 1263

SHIPPING NAME: Paint

PACKING GROUP: II

CONTAINERS FOLLOW THE STANDARDS.

SECTION XV: REGULATORY INFORMATION

WHMIS

B2: Flammable liquid (flash point below 37.8°C).

DSL: All constituents of this product are included in the Domestic Substances List (DSL – Canada).

TSCA: All constituents of this product are included in the Toxic Substances Control Act Inventory (TSCA – USA).

HMIS (USA):		NFPA (USA):	
Health	2	Health	2
Flammability	3	Flammability	3
Physical hazard	0	Instability	0
Protective equipment	G	Specific hazard	-

SECTION XVI: OTHER INFORMATION

GLOSSARY

ANSI:	American National Standards Institute
ASTM:	American Society for Testing and Materials
CAS:	Chemical Abstract Services
CSA:	Canadian Standardisation Association
DOT:	Department of Transportation
EPA:	Environmental Protection Agency (United States)
HMIS:	Hazardous Material Information System
LD₅₀/LC₅₀:	Less high lethal dose and lethal concentration published
NFPA:	National Fire Protection Association
OSHA:	Occupational Safety & Health Administration (United States)
RCRA:	Resource Conservation and Recovery Act (United States)
TDG:	Transportation of Dangerous Goods (Canada)
TLV-TWA:	Threshold Limit Value – Time-weighted Average
WHMIS:	Workplace Hazardous Materials Information System (Canada)

Reference:

- (1) CHEMINFO (2010) Canadian Centre for Occupational Health and Safety, Hamilton (Ontario) Canada
- (2) Manufacturer's MSDS

Code of MSDS:

CA U DRU SS FS 173

For more information:

1 800 567-1492

The Material Safety Data Sheets of SOPREMA Canada are available on Internet at the following site: www.soprema.ca

Justification of the update:

- New product.

This MSDS contains all the information required by ANSI Z400.1 standard (United States), by regulation 29 CFR Part. 1910-1200 of the Hazard Communication Standard of OSHA and is in accordance with standard DORS/88-66 of WHMIS (Canada).

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy of completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MATERIAL SAFETY DATA SHEET

ALSAN TRAFIK HP 515 PART B

Offerte en français

WHMIS	PROTECTIVE CLOTHING	TRANSPORT OF DANGEROUS GOODS
		Not regulated

SECTION I: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Use: Bi-component waterproofing polyurethane primer.

Formula number: 878.1

Manufacturer / Distributors :

Soprema Canada
1675, Haggerty Street
Drummondville (Quebec) J2C 5P7
CANADA
Tel. : 819 478-8163

Soprema inc.
44955, Yale Road West
Chilliwack (C.-B.) V2R 4H3
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Tel. : 604 793-7100

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310, Quadral Drive
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12251 Seaway Road
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Tel. : 228 701-1900

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CANUTEC (Canada) (24h.) : 613 996-6666

CHEMTREC (USA) (24h.) : 1 800 424-9300

EMERGENCY OVERVIEW

Brownish-red liquid with slightly musty odour. CAUTION! The aerosol may be fatal if inhaled. May cause lung injury. Effects may be delayed. May cause severe allergic respiratory reaction. Causes skin irritation. May cause severe allergic skin reaction. May be harmful or fatal if swallowed.

Irritating and/or toxic gases or fumes may be generated by thermal decomposition or combustion.

SECTION II: COMPOSITION AND INFORMATION ON DANGEROUS INGREDIENTS

NAME	CAS #	% WEIGHT	EXPOSURE LIMIT (ACGIH)	
			TLV-TWA	TLV-STEL
Methylene diphenyl diisocyanate (MDI)	101-68-8	30-60	0.005 ppm	Not established
Polymeric diphenylmethane diisocyanate (PMPPI)	9016-87-9	30-60	0.005 ppm	Not established
Propylene carbonate	108-32-7	10-30	Not established	Not established

SECTION III: POTENTIAL HEALTH EFFECTS

Effects of Short-Term (Acute) Exposure

INHALATION

4,4'-MDI and PMPPI have a very low vapour pressure. Therefore, airborne exposures are unlikely to occur unless they are heated or form an aerosol or mist during pouring, frothing or spraying operations. Short-term inhalation exposure to isocyanates can cause respiratory and mucous membrane irritation. Symptoms include eye and nose irritation, dry or sore throat, runny nose, shortness of breath, wheezing and laryngitis. Coughing with chest pain or tightness may also occur, frequently at night. These symptoms may occur during exposure or may be delayed several hours. High aerosol concentrations could cause inflammation of the lung tissue (chemical pneumonitis), chemical bronchitis with severe asthma-like wheezing, severe coughing spasms and accumulation of fluid in the lungs (pulmonary oedema), which could prove fatal. Symptoms of pulmonary oedema may not appear until several hours after exposure and are aggravated by physical exertion. (1)

Propylene carbonate: Propylene carbonate does not readily form a vapour at room temperature. Therefore, it must be heated or misted before inhalation exposure would occur. Propylene carbonate is not expected to produce significant harmful effects by this route of exposure, based on limited animal information. There is no human information available. (1)

SKIN CONTACT

4,4'-MDI is a severe skin irritant based on animal information. PMPPI is a severe skin irritant based on information for MDI, a major component of PMPPI. In general, isocyanates can cause skin

discolouration (staining) and hardening of the skin after repeated exposures. Skin contact is not expected to result in the absorption of harmful amounts. (1)

Propylene carbonate: Propylene carbonate is a very mild irritant based on animal and human information. It does not readily absorb through the skin. (1)

EYE CONTACT

4,4'-MDI: 4,4'-MDI may cause no irritation or slight eye irritation based on animal information. (1)

PMPPI: PMPPI is a mild eye irritant based on animal information for PMPPI and MDI. (1)

Propylene carbonate: Propylene carbonate is a moderate to severe eye irritant, based on animal information. (1)

INGESTION

There have been no reports of human ingestion of 4,4'-MDI or PMPPI. Animal studies indicate that the toxic effects of the ingestion of 4,4'-MDI and PMPPI are slight. Ingestion could result in irritation and corrosion of the mouth, throat, and digestive tract. Ingestion is not a typical route of occupational exposure. (1)

Propylene carbonate: Propylene carbonate is not expected to be toxic based on animal information. There is no human information available. Ingestion is not a typical route of occupational exposure. (1)

Effects of Long-Term (Chronic) Exposure

LUNGS/RESPIRATORY SYSTEM

Exposure to isocyanates is likely to cause aggravation to individuals with existing respiratory disease, such as chronic bronchitis and emphysema. (1)

RESPIRATORY SENSITIZATION

Respiratory sensitization can develop in people working with 4,4'-MDI and PMPPi or its main component MDI. The sensitization is usually caused by a very large exposure or by multiple exposures. Although varying periods of exposure (1 day to years) may elapse before sensitization occurs, it develops more often during the first few months of exposure. Sensitized individuals react to very low levels of MDI (as low as 0.0014 ppm) that have no effect on unsensitized people. At first, the symptoms may appear to be a cold or mild hay fever. However, severe asthmatic symptoms can develop and include wheezing, chest tightness, shortness of breath, difficulty breathing and/or coughing. Fever, chills, general feelings of discomfort, headache and fatigue can also occur. Symptoms may occur immediately upon exposure, within an hour or several hours after exposure or both and/or at night. Typically the asthma improves with removal from exposure (e.g. weekends and vacations) and returns, in some cases, in the form of an "acute attack" on renewed exposure. Sensitized people who continue to work with isocyanates may develop symptoms sooner after each exposure. The number and severity of symptoms may increase. Following removal from exposure, some workers may continue to have persistent respiratory problems such as asthmatic symptoms, bronchial problems and hypersensitivity to isocyanates. Others may recover fully and may gradually lose their sensitivity within several years. Exposure to isocyanates is likely to cause aggravation to individuals with existing respiratory disease, such as chronic bronchitis and emphysema. Cross-sensitization between different isocyanates may occur. (1)

SKIN SENSITIZATION

Isocyanates are contact sensitizers. Repeated skin contact with 4,4'-MDI and PMPPi may cause skin sensitization in humans. Further skin contact may result in skin inflammation, rash, itching and staining. Allergic contact dermatitis has developed from occupational contact with MDI. (1)

Propylene carbonate: Propylene carbonate did not produce skin sensitization in groups of 50 volunteers tested with 5% and 10% propylene carbonate in water solutions. Sensitization testing with cosmetic products containing propylene carbonate has consistently produced negative results. There is no other human information available. (1)

CARCINOGENICITY

The risk of cancer associated with exposure to isocyanates has been examined in 4 human population studies. No strong association or consistent pattern has been observed. The International Agency for Research on Cancer (IARC) has determined there is inadequate evidence for the carcinogenicity of MDI or polymeric MDI (4,4'-MDI, PMPPi) in humans. There is limited evidence for the carcinogenicity of a mixture containing MDI and polymeric MDI in experimental animals. (1)

4,4'-MDI: IARC has concluded that this chemical is not classifiable as to its carcinogenicity to humans (Group 3). The American Conference of Governmental Industrial Hygienists (ACGIH) has not assigned a carcinogenicity designation to this chemical. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

PMPPi: IARC has concluded that this chemical is not classifiable as to its carcinogenicity to humans (Group 3). The ACGIH has no listing for this chemical. The NTP has not listed this chemical in its report on carcinogens. (1)

Propylene carbonate: There is no human information available. A negative result was obtained for dermal exposure to propylene carbonate in an unconfirmed animal study. The IARC has not evaluated

the carcinogenicity of this chemical. The ACGIH has no listing for this chemical. The NTP has not listed this chemical in its report on carcinogens.

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY

No human or animal information is available. (1)

REPRODUCTIVE TOXICITY

No human or animal information is available. (1)

MUTAGENICITY

It is not possible to conclude that 4,4'-MDI or PMPPi are mutagenic. No human or animal in vivo studies on 4,4'-MDI and PMPPi have been reported. In one human case report, MDI, a main component of PMPPi, caused DNA damage in white blood cells after inhalation exposure to 5 to 20 ppb. No conclusions can be drawn from this case report. (1)

Propylene carbonate: There is no human information available. Negative results were obtained for propylene carbonate in bacteria and in mammalian cells. An inconclusive result was obtained in one strain of bacteria. (1)

TOXICOLOGICALLY SYNERGISTIC MATERIALS

No information is available. (1)

POTENTIAL FOR ACCUMULATION

4,4'-MDI: 4,4'-MDI can enter the body by inhalation or ingestion. It is probably metabolized to 4,4'-methylene dianiline, which is metabolized further and excreted. (1)

PMPPi: Probably does not accumulate. No information on the breakdown (metabolism) of PMPPi is available. Reacts with water and tissues. MDI is probably metabolized to 4,4'-methylene dianiline, which is further metabolized and excreted. (1)

Propylene carbonate: Probably does not accumulate. (1)

SECTION IV: FIRST AID MEASURES

SKIN CONTACT

Remove contaminated clothing. Wash thoroughly with soap and water. If irritation persists, get medical attention.

EYE CONTACT

Flush thoroughly with water for at least 20 minutes. Get medical attention.

INHALATION

In case of gas or vapour inhalation, move victim to fresh air. Do not allow victim to move about unnecessarily. If breathing is difficult, give oxygen. If breathing stops, give respiratory assistance. Avoid mouth-to-mouth contact by using mouth guards or shields. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure. Obtain medical assistance.

SWALLOWING

Do not induce vomiting. Immediately contact local poison control centre. Should vomiting occur, be sure to keep the victim's head below hips to avoid aspiration of vomit into the lungs. Have victim rinse mouth with water. Maintain the victim at rest and obtain immediate medical attention.

SECTION V: FIRE-FIGHTING MEASURES

FLAMMABILITY: Non flammable.

FLASH POINT: 130°C

AUTO-IGNITION TEMPERATURE: > 600°C

FLAMMABILITY LIMITS IN AIR: (% in volume) Not applicable

COMBUSTION PRODUCTS

Carbon oxides (CO, CO₂), nitrogen oxides and hydrogen cyanide.

FIRE FIGHTING INSTRUCTIONS

Evacuate area. Wear self-contained breathing apparatus and appropriate protective clothing in accordance with standards. Approach fire from upwind and fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Always stay away from containers because of the high risk of explosion. Stop leak before attempting to put out the fire. If leak cannot be stopped, and if there is no risk to the surrounding area, let the fire burn itself out. Move containers from fire area if this can be done without risk. Cool containers with flooding quantities of water until well after fire is out.

MEANS OF EXTINCTION

Carbon dioxide, dry chemical powder, protein foam, water spray (for large fires). Alcohol resistant foams are preferred for large fires. General purpose synthetic foams or protein foams may work, but much less effective. Care must be taken since the reaction between water and water-based foam and isocyanates can be vigorous.

SECTION VI: ACCIDENTAL RELEASE MEASURES

RELEASE OR SPILL

Ventilate area. Wear appropriate protective equipment during cleanup. Eliminate all ignition sources. Shut off source of leak if it can be done without risk. Contain the spill. Absorb with inert material such as sand or earth. Sweep or shovel into containers with lids, use clean non-sparking tools (e.g. plastic) to collect absorbed material. Cover and remove to appropriate well-ventilated area until disposal. Wash spill area with isocyanates decontaminating solution. Prevent entry into waterways, sewers, basements. Dispose of this product according to local environmental regulations.

SECTION VII: HANDLING AND STORAGE

HANDLING

This product and its vapours are toxic. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing mist, vapour or dust. Wash thoroughly after handling. Before handling, it is very important that ventilation controls are operating and protective equipment requirements are being followed. People working with this product should be properly trained regarding its hazards and its safe use. Keep away from heat. Tightly reseal all partially used containers. Do not cut, puncture or weld empty containers.

STORAGE

Store in a cool well-ventilated area out of direct sunlight and away from heat and ignition sources. Keep storage areas clear of combustible materials. No smoking near storage area. Store away from incompatible materials. Store the product according to occupational health and safety regulations and fire and building codes. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Have appropriate fire extinguishers and spill clean-up equipment near storage area. Inspect all containers to make sure they are properly labelled.

SECTION VIII: EXPOSURE CONTROLS / PERSONAL PROTECTION

HANDS: Wear polyethylene, ethylene, vinyl alcohol, butyl rubber, natural rubber, neoprene rubber, nitril rubber, polyvinyl alcohol, polyvinyl chloride or Viton gloves.

RESPIRATORY: If the TLV is exceeded, if use is performed in a poorly ventilated confined area, use an approved respirator in accordance with standards.

EYES: Wear chemical safety goggles in accordance with standards.

OTHERS: Eye bath and safety shower.

CONTROL OF VAPOURS: Local exhaust is needed to control vapour and dust level to below recommended limits.

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOUR AND APPEARANCE:	Brownish-red liquid with slightly musty odour
ODOUR THRESHOLD:	Not available
VAPOUR DENSITY (air = 1):	8.5
EVAPORATION RATE (Butyl acetate = 1):	Not available
BOILING POINT (760 mm Hg):	> 300 °C
FREEZING POINT:	Not available
SPECIFIC GRAVITY (H₂O = 1):	1.22 kg / L
SOLUBILITY IN WATER (20°C):	Not soluble
VOLATILE ORGANIC COMPOUND (V.O.C.):	0 g/L
VISCOSITY:	45 cP (Visco Brookfield LVT)

SECTION X: STABILITY AND REACTIVITY

STABILITY: This material is stable.

INCOMPATIBILITY: Water amines, alcohol, strong acids, strong bases, strong oxidizing agents, amides, phenols, mercaptans, urethanes, ureas and surface active compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: 4,4'-Methylene dianiline (formed by reaction of MDI with water).

CONDITIONS TO AVOID: Moisture, heat, direct sunlight.

HAZARDOUS POLYMERISATION: None.

SECTION XI: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA

4,4'-MDI: (1)

LC ₅₀ (rat):	490 mg/m ³ (4-hour exposure - aerosol)
LD ₅₀ (oral, rat):	> 10 000 mg/kg
LD ₅₀ (dermal, rabbit):	> 10 000 mg/kg

PMPPi: (1)

LC ₅₀ (male rat):	490 mg/m ³ (4-hour exposure - aerosol)
LD ₅₀ (oral, rat):	10 000 mg/kg
LD ₅₀ (dermal, rabbit):	6 200 mg/kg

Propylene carbonate: (1)

LC ₅₀ (male rat):	5 000 mg/m ³ (4-hour exposure)
LD ₅₀ (oral, rat):	29 100 mg/kg
LD ₅₀ (dermal, rabbit):	> 26 400 mg/kg

Effects of Short-Term (Acute) Exposure

INHALATION

4,4'-MDI: MDI has a very low vapour pressure and it is difficult to achieve vapour concentrations necessary for inhalation toxicity testing. Therefore, inhalation toxicity studies have focused on the effects of the aerosol. No significant effects were found when rats were exposed to 2, 5 and 15 mg/m³ of MDI aerosol for 6 hours/day, 5 days/week for 2 weeks. (1)

PMPPi: PMPPi has an extremely low vapour pressure and it is difficult to achieve vapour concentrations necessary for inhalation toxicity testing. The desired vapour concentrations can only be obtained by heating the PMPPi source. The vapour evolved readily condenses to an aerosol in the inhalation exposure chambers. Therefore, it is likely that an aerosol rather than a vapour is present. No harmful effects or changes in body weight were observed in rats exposed to PMPPi vapour near the saturation concentration (estimated concentration: 0.2 ppm). (1)

Propylene carbonate: An 8-hour exposure to concentrated vapour of propylene carbonate was not lethal to rats. (1)

EYE IRRITATION

4,4'-MDI: 4,4'-MDI has caused no irritation or slight irritation of the eyes. (1)

PMPPi: PMPPi is a mild eye irritant. (1)

Propylene carbonate: Propylene carbonate is a moderate to severe eye irritant. (1)

SKIN IRRITATION

4,4'-MDI: MDI is a severe skin irritant. (1)

PMPPI: No specific information was located for PMPPI. MDI, a major component of PMPPI, is a severe skin irritant. (1)

Propylene carbonate: Propylene carbonate is a very mild irritant. (1)

INGESTION

4,4'-MDI: Rats were given daily doses of 4.3 to 5 g/kg for 5 days. The only effect was a slight enlargement of the spleen in 2 of 5 rats. (1)

PMPPI: No information available. (1)

Propylene carbonate: Rats orally exposed to a single dose of 5 000 mg/kg propylene carbonate showed salivation, but no other harmful effects. (1)

Effects of Long-Term (Chronic) Exposure

INHALATION

PMPPI: In two studies, six-week old rats were exposed to 0.35, 1.4 or 7.2 mg/m³, or 4.1, 8.4 or 12.3 mg/m³ PMPPI aerosol for 13 weeks. In the first study, a temporary reduction in growth was seen in males and minor cellular changes were observed in the lungs of both sexes at 7.2 mg/m³. In the second study, severe respiratory distress and deaths occurred at 12.3 mg/m³. Less pronounced irritation, increased lung weights and cellular changes in the lungs, but no deaths were observed at 8.4 mg/m³. (1)

4,4'-MDI: No information available. (1)

Propylene carbonate: Rats were exposed to 0, 100, 500, or 1 000 mg/m³/day of propylene carbonate aerosol for 90 days. Blood and urine analysis showed no differences from the control for any of the test groups. The only sign of toxicity observed was some swelling of the eyes at 500 and 1 000 mg/m³/day. There were no effects on behaviour or on motor activity following 6 or 13 weeks of exposure. (1)

RESPIRATORY SENSITIZATION

PMPPI: Mild, but not significant sensitization-like responses occurred in guinea-pigs that inhaled commercial PMPPI at 4.6 mg/m³ for 4 hours/day for 5 days. (1)

4,4'-MDI and propylene carbonate: No information available. (1)

SKIN SENSITIZATION

4,4'-MDI: The sensitizing potency of MDI was investigated using the mouse ear-swelling test (MEST). The dose required to sensitize 50% of the animals was 0.73 mg/kg. In this test, MDI was less potent than hexamethylene diisocyanate (HDI) and dicyclohexylmethane diisocyanate (HMDI), but more sensitizing than toluene diisocyanate (TDI). Cross reactivity was observed between MDI and HDI, HMDI and TDI. (1)

PMPPI: Commercial PMPPI caused skin sensitization in guinea-pigs that had previously inhaled MDI. The degree of sensitization appeared to be greater for PMPPI than for MDI. (1)

Propylene carbonate: Propylene carbonate did not show skin sensitization in guinea pigs. (1)

CARCINOGENICITY

4,4'-MDI: There is no animal information on the carcinogenicity of MDI itself. In one study, polymeric MDI containing 44.8-50.2% monomeric MDI was tested for carcinogenicity by inhalation in rats. An increased incidence of lung tumours was observed. IARC has determined there is limited evidence for the carcinogenicity of a mixture containing monomeric and polymeric MDI to experimental animals. (1)

PMPPI: Rats were exposed to 0.2, 1.0 or 6.0 mg/m³ respirable PMPPI aerosol for up to 24 months (6 hours/day, 5 days/week). Indicators of recurrent lung tissue damage were seen at 1.0 and 6.0 mg/m³. An increase in the incidence of lung cancer was also observed at 6.0 mg/m³. It was concluded that exposure to PMPPI at concentrations leading to recurrent lung damage was associated with the development

of pulmonary tumours. IARC has concluded there is limited evidence for the carcinogenicity of a mixture containing MDI and PMPPI in experimental animals. (1)

Propylene carbonate: A negative result was obtained for mice exposed dermally to 50microL, two times/week for 104 weeks. (1)

MUTAGENICITY

4,4'-MDI: It is not possible to conclude that MDI is mutagenic. (1)

PMPPI: No information available. (1)

Propylene carbonate: The available information does not indicate that propylene carbonate is mutagenic. (1)

SECTION XII: ECOLOGICAL INFORMATION

ENVIRONMENTAL EFFECTS

Do not allow product or runoff from fire control to enter grounds, basements storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial and federal regulations may require that environmental and / or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities. May be harmful to aquatic life.

SECTION XIII: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

This product is considered as dangerous material. Consult local, state, provincial or territory authorities to know disposal methods. This material is also known as dangerous waste by RCRA (USA); disposal should follow EPA regulations.

SECTION XIV: TRANSPORT INFORMATION

This product is not regulated by DOT and TDG.

SECTION XV: REGULATORY INFORMATION

WHMIS

D2A: Other effects – (Chronic toxicity, respiratory tract sensitization)

D2B: Other effects – Toxic (Skin irritation, skin sensitization)

DSL: All constituents of this product are included on the Domestic Substances List (DSL – Canada)

TSCA: All constituents of this product are included on the Toxic Substances Control Act Inventory (TSCA – USA).

HMIS (USA):		NFPA (USA):	
Health	2	Health	2
Flammability	0	Flammability	0
Physical hazard	1	Instability	1
Protective equipment	G	Specific hazard	-

SECTION XVI: OTHER INFORMATION

GLOSSARY

ANSI:	American National Standards Institute
ASTM:	American Society for Testing and Materials
CAS:	Chemical Abstract Services
CSA:	Canadian Standardisation Association
DOT:	Department of Transportation (United States)
EPA:	Environmental Protection Agency (United States)
HMIS:	Hazardous Material Information System
LD₅₀/LC₅₀:	Less high lethal dose and lethal concentration published
NFPA:	National Fire Protection Association (United States)
OSHA:	Occupational Safety & Health Administration (United States)
RCRA:	Resource Conservation and Recovery Act (United States)
TDG:	Transportation of Dangerous Goods
TLV-TWA:	Threshold Limit Value – Time-weighted average
WHMIS:	Workplace Hazardous Materials Information System (Canada)

Reference:

- (1) CHEMINFO (2010) Canadian Centre of Occupational Health and Safety, Hamilton (Ontario) Canada.

Code of MSDS:

CA U DRU SS FS 186

For more information:

1 800 567-1492

The Material Safety Data Sheets of SOPREMA Canada are available on Internet at the following site: www.soprema.ca

Justification of the update:

- New product.

This MSDS contains all the information required by ANSI Z-400.1-1998 standard (United States), by regulation 29 CFR Part 1910.1200 of the Hazard Communication Standard of OSHA, and is in accordance with standard DORS/88-66 OF WHMIS Canada.

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