

ALSAN 500 FT

Disponible en français

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

SECTION I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name:	Alsan 500 FT	
Use:	Waterproofing polyurethane transparent resin mono-component used for finishing.	
Code of MSDS:	CA U DRU SS FS 010	
Formula number:	544.1	
Revision date:	December 13, 2007	
Revised by:	Michel Galtier, Health and Safety Supervisor (800) 567-1492 mgaltier@soprema.ca	
Manufacturer:	Soprema Inc. 1675 Haggerty Street Drummondville (Quebec) J2C 5P7 CANADA Tel.: (819) 478-8163	
Distributors:	Soprema Inc. 44955 Yale Road West Chilliwack (B.-C.) V2R 4H3 CANADA Tel.: (604) 793-7100	Soprema USA 310, Quadral Drive Wadsworth (Ohio) 44281 UNITED STATES Tel.: (800) 356-3521
In case of emergency:	<p>SOPREMA (8:00 am to 5:00 pm – Eastern time): (800) 567-1492 CANUTEC (Canada) (24h.): (613) 996-6666 CHEMTREC (USA) (24h.): (800) 424-9300 Poison Control Centre: Consult local telephone directory</p>	

EMERGENCY OVERVIEW!!!

Caution! This product and its vapours are highly flammable. Vapours are heavier than air and may spread long distances. Distant ignition and flash back are possible.

May cause irritation to eyes, skin and respiratory tract. High vapour concentrations may cause depression of central nervous system. This product contains isocyanates. May cause sensitization by inhalation and by contact with skin. 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
Isophorone diisocyanate (IPDI)	4098-71-9	15-40	0.005 ppm	Not established
Propyleneglycol methylethyl acetate (PGMEA)	108-65-6	10-30	50 ppm	Not established
Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester	59719-67-4	7-13	Not established	Not established
Toluene	108-88-3	7-13	20 ppm	Not established
Methyl ethyl ketone (MEK)	78-93-3	5-10	200 ppm	300 ppm
Xylene	1330-20-7	0.1-1	100 ppm	150 ppm

SECTION III. POTENTIAL HEALTH EFFECTS

Effects of Short-Term (Acute) Exposure

INHALATION:

IPDI: Reports of occupational exposures to isophorone diisocyanate (IPDI) are restricted to spray painting operations. IPDI has a very low vapour pressure and airborne exposures are unlikely to occur unless IPDI is heated or forms an aerosol or mist during spraying operations. IPDI aerosol or mist can cause respiratory tract and mucous membrane irritation. Typical symptoms include eye and nose irritation, dry or sore throat, runny nose, shortness of breath, difficulty in breathing, 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. Short (1 to 5 minutes) exposures of volunteers to IPDI aerosol levels of 0.64 mg/m³ caused slight throat irritation. Aerosol levels of 1.37 mg/m³ caused unbearably strong nose and throat irritation. At 0.25 mg/m³, the odour was hardly perceptible. High aerosol concentrations could cause inflammation of the lungs (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. Some people may become sensitized to IPDI. (1)

PGMEA: PGMEA is not expected to cause any effects based on the low concentration level of this chemical in the product. Based on the effect of the chemically-similar propylene glycol monomethyl ether (PGME), irritation of the nose and throat from inhalation of propylene glycol monomethyl ether acetate (PGMEA) vapour or mist would be expected. (1)

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: Harmful, and may cause sensitization by inhalation. Based on the available properties of the isocyanate content of this product, respiratory exposure may cause acute irritation and/or sensitization of the respiratory system, resulting in asthmatic symptoms, wheezing and a tightness of the chest. Sensitized persons may subsequently show asthmatic symptoms when exposed to airborne concentrations of isocyanates well below the occupational exposure limit. Repeated exposure may lead to permanent respiratory disability. Exposure to organic vapours may result in adverse health effects, especially when used in confined / unventilated areas, such as irritation of the mucus membrane and the respiratory system and adverse effects on the renal and central nervous systems. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases loss of consciousness. (2)

Toluene: The main effect of inhaling toluene vapour is on the central nervous system (CNS). Symptoms are related to exposure concentration. At approximately 50 ppm, slight drowsiness and headache have been reported. Irritation of the nose, throat and respiratory tract has occurred between 50 and 100 ppm. Concentrations of about 100 ppm have caused fatigue and dizziness; over 200 ppm have caused symptoms similar to drunkenness (giddiness), numbness, and mild nausea; over 500 ppm have caused mental confusion and incoordination. (1)

MEK: Brief (3-5 minutes) exposures to methyl ethyl ketone (MEK) vapours produced slight nose and throat irritation at 200 ppm and definite nose and throat irritation at 350 ppm in approximately 10 people. 143 volunteers exposed to 200 ppm for 4 hours reported throat irritation, unpleasant odour, nausea, and headache (in order of frequency reported). Higher exposures are expected to cause central nervous system depression with symptoms such as headache, nausea, dizziness, drowsiness, and confusion. extremely high concentrations may cause loss of consciousness and possibly death. Neurobehavioral effects of exposures to MEK (200 ppm for 4 hours) were studied with 137 volunteers. There were no statistically significant effects observed in biochemical, psychomotor, sensorimotor and psychological tests. Similar findings have been reported in other studies. Four volunteers were exposed to 90 to 270 ppm MEK for 4 hours/days for 4 days. Minor disturbances in time perception were observed. (1)

Xylene: The main effect of inhaling xylene vapour is depression of the central nervous system (CNS, with symptoms such as headache, dizziness, nausea and vomiting. Volunteers have tolerated 100 ppm, but higher concentrations become objectionable. Irritation of the nose and throat can occur at approximately 200 ppm after 3 to 5 minutes. Exposures estimated at 700 ppm have caused nausea and vomiting. Extremely high concentrations (approximately 10,000 ppm) could cause incoordination, loss of consciousness, respiratory failure and death. In some cases, a potentially fatal accumulation of fluid in the lungs (pulmonary oedema) may result. Symptoms of pulmonary oedema, such as shortness of breath and difficult breathing, may be delayed several hours after exposure. However, these effects are rarely seen since xylene is irritating and identifiable by odour at much lower concentrations. The only reported death resulted from exposure to xylenes (unspecified isomer composition and unknown concentration) in a confined space. Reversible liver and kidney damage has been reported in cases of severe xylene exposure. Results of short-term studies on human volunteers indicate that xylenes can cause

SECTION III. POTENTIAL HEALTH EFFECTS

INHALATION:

Xylene (continued): neurobehavioral effects such as impaired short-term memory and reaction time (300 ppm mixed xylenes, with exercise) and alterations in body balance (65 to 400 ppm m-xylene). Exposure to 300 or 400 ppm mixed xylenes or 65 to 150 ppm p-xylene has not had similar effects. This variation in results is probably due to differences in the effects being studied, exposure conditions, development of tolerance and total xylene uptake (which increases during exercise). (1)

SKIN CONTACT:

IPDI: Liquid IPDI can cause severe skin irritation. Prolonged contact can cause severe inflammation with redness, rash, swelling and blistering. Isocyanates, in general, can cause skin discolouration (staining) and hardening of the skin after repeated exposures. IPDI caused severe skin irritation when applied to rabbit skin. IPDI is a very strong skin sensitizer. Skin sensitization may occur after only one contact with IPDI. (1)

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: May cause sensitization by skin contact. (2)

MEK: MEK can be absorbed through the skin but skin contact is not expected to result in the absorption of harmful amounts. (1)

Xylene: Studies with xylene isomers have shown irritation, redness and a burning sensation can result from contact. These effects are reversible shortly (usually within 1 hour) after the contact stops. Xylene liquid or vapour can be absorbed through the skin, but not as readily as when inhaled or ingested. Significant harmful effects are not expected by this route of exposure. (1)

EYE CONTACT:

Vapours or eye contact may cause eye irritation, redness and pain.

IPDI: IPDI liquid, aerosol or mist can cause eye irritation. People exposed to IPDI aerosol levels of 0.64 mg/m³ experienced slight eye irritation, while aerosol levels of 1.37 mg/m³ caused strong eye irritation. Liquid IPDI caused severe eye damage when applied to rabbit eyes. (1)

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: May cause irritation. (2)

Xylene: The liquid is probably a mild irritant, based on animal information. Eye irritant has been reported at vapour levels as low as 200 ppm. Corneal vacuoles (pockets of fluid or air in the cornea) have also been reported following exposure to undefined vapour concentrations. This effect was reversible within 8 to 11 days for 7 of 8 workers. (1)

INGESTION:

It is unlikely that this product would be ingested with normal use. If significant amount of the product were ingested, symptoms as described for inhalation might occur. This product may cause irritation, mouth and throat burns and abdominal pains.

IPDI: There have been no reports of people ingesting IPDI and ingestion is unlikely to occur in the workplace. Animal studies indicate that IPDI has low oral toxicity. Ingestion could cause irritation of the tissues of the mouth, throat and digestive tract. (1)

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: May cause discomfort and risk of lung damage if vomiting results. (2)

Xylene: Based on animal information, xylene is only slightly toxic by ingestion. Ingestion of large amounts is likely to cause CNS effects such as dizziness, nausea and vomiting. In one case, ingestion of food probably contaminated with xylene caused pulmonary oedema, liver impairment and coma. The man recovered within 2 hours after treatment. Ingestion is not a common route of occupational exposure. Although there are no case reports, xylene may be aspirated, based on its physical properties (viscosity and surface tension). Aspiration is the inhalation of a material into the lungs during ingestion or vomiting. Severe lung irritation, damage to the lung tissues and death may result. (1)

Effects of Long-Term (Chronic) Exposure

RESPIRATORY EFFECTS:

IPDI: In general, isocyanates are well known to cause respiratory sensitization. There are two case reports of respiratory sensitization caused by exposure to IPDI in spray paint. It has been suggested that IPDI is a weak respiratory sensitizer. Isocyanate respiratory 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 airborne isocyanates 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, tightness of the chest, 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), several hours after exposure or both, and/or at night. Typically, the asthma improves with removal from exposure (e.g. weekends or vacations) and returns, in some cases, in the form of an "acute attack", on renewed exposure. Sensitized people who continue to be exposed to isocyanates at work may develop symptoms sooner after each exposure. The number and severity of symptoms may increase. Following removal from isocyanate exposure, some sensitized people may continue to show a slow decline in lung function and have persistent respiratory problems, such as chronic bronchitis for months or years. Others may recover fully and gradually lose their sensitivity within several years. Cross-sensitization between different isocyanates may occur. Exposure to isocyanates is likely to aggravate individuals with existing respiratory disease, such as chronic bronchitis and emphysema. (1)

PGMEA, Toluene, MEK: No human or animal information is available.

SECTION III. POTENTIAL HEALTH EFFECTS

SKIN SENSITIZATION:

IPDI: IPDI is a very strong sensitizing agent. Sensitization may occur after a single exposure or develop gradually over time. Symptoms include a rash on the hands, arms, neck, face, chest or abdomen even upon contact with a small amount of IPDI. Other effects such as coughing, a burning sensation in the throat, or redness and swelling of the eyes. In a case study, a single 1-hour exposure to IPDI caused a rash in 3 of 4 workers. Only one worker had previous contact with IPDI, the rest had worked. Only one worker had previous contact with IPDI, the rest had worked with TDI and MDI (suggesting cross-sensitization). Cross-sensitivity has been shown to occur between IPDI and isophorone diamine (IPD).

Xylene: Repeated contact can produce dermatitis (dryness and cracking) due to degreasing action. Skin sensitization was not produced in any of 24 volunteers. There is one case report of a person developing an allergic skin reaction (contact urticaria) following exposure to xylene (unspecified composition) vapour. The person subsequently tested positive in a patch test. No information was provided regarding previous history of allergies. No conclusions can be drawn regarding the potential for xylene to produce allergic skin reactions, based on this single case report. (1)

NERVOUS SYSTEM:

Toluene, MEK: Inhalation of solvent such as toluene and MEK may cause nervous system problems. Numerous studies of rotogravure printers, painters and rubberized-matting workers with chronic exposure to toluene are inconclusive about chronic central nervous system (CNS) damage. Some studies report changes such as memory loss, sleep disturbances, loss of ability to concentrate, or incoordination, while others report no effects. Recent studies using sensitive neurobehavioral tests have shown altered scores for exposed workers but whether or not these indicate CNS damage is not clear. (1)

Xylene: Long-term xylene exposure may cause harmful effects on the central nervous system, but there is not enough information available to draw firm conclusions. Symptoms such as headaches, irritability, depression, insomnia, agitation, extreme tiredness, tremors, and impaired concentration and short-term memory have been reported following long-term occupational exposure to xylene and other solvents. This condition is sometimes generally referred to as "organic solvent syndrome". Unfortunately, there is very little information available which isolates xylenes from other solvent exposures in the examination of these effects. Other study deficiencies include inadequate reporting on the duration of exposure and the exposure levels, and poor matching of controls. In a recent study, 175 employees were exposed to an average xylene concentration of 21 ppm for an average of 7 years. Subjective symptoms such as anxiety, forgetfulness, inability to concentrate and dizziness were reported. Xylenes accounted for greater than 70% of the total exposure. This study is also limited by factors such as those described above. (1)

PGMEA: No human or animal information is available.

TARGET ORGANS:

Toluene: In two cases of acute occupational exposure of toluene, there were no blood disorders, liver or kidney damage. Historical reports of blood effects caused by toluene are more than likely due to benzene contamination. Liver and kidney effects, as well as heart disturbances, have been reported in cases of solvent abuse (glue-sniffing). These extreme exposures are not relevant to occupational situations. Reversible kidney failure has resulted from a severe occupational exposure in a paint factory. In epidemiological studies on workers exposed long-term to levels up to 200 ppm, there was no clear evidence of kidney damage. Occupational exposure to up to 500 ppm toluene has not been associated with liver effects. There is some evidence to suggest that long-term exposure to toluene may affect hearing. However, the limited information available does not allow a conclusion to be drawn. Although minor changes in blood parameters have been observed, it is generally accepted that toluene does not cause significant blood disorders. (1)

Xylene: BLOOD EFFECTS: Historical reports sometimes associate xylene exposure with certain blood effects, including leukemia, which are now known to be caused by benzene. Uncontaminated xylene is not known to cause these effects. Reduced blood platelet counts were observed in 12 of 27 men exposed to mixed xylene (unspecified composition) at a level up to 200 ppm. When exposure stopped, platelet counts returned to normal. There is insufficient information to draw any conclusions from this study. LIVER AND KIDNEY EFFECTS: A number of case reports and occupational studies have suggested that liver and kidney damage may result from long-term occupational exposure to xylene. However, it is not possible to attribute these effects directly to xylene exposure because generally there was exposure to other chemicals at the same time, particularly other solvents, and there was no information provided on the exposure levels or duration of exposure. In a recent study, 175 employees were exposed to a mean xylene concentration of 21 ppm for an average of 7 years. Liver and kidney effects were not reported. Xylenes accounted for greater than 70% of the total exposure. (1)

PGMEA, MEK: No human or animal information is available.

CARCINOGENICITY:

IPDI: No human or animal information is available on the carcinogenicity of IPDI. 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)

PGMEA: No human or animal information is 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 any of these chemicals. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

Toluene: There have been several human population studies which have examined the possible relationship between toluene exposure and cancer. Cancers of most sites were not significantly associated with toluene exposure in any study. Stomach cancer mortality, lung cancer rates and colorectal cancers were evaluated in some studies, but not others. Considering the multiple exposures in most studies and the inconsistencies in findings, it is not possible to conclude that toluene exposure is associated with cancer in humans. The International

SECTION III. POTENTIAL HEALTH EFFECTS

CARCINOGENICITY:

Toluene (continued): Agency for Research on Cancer (IARC) has concluded there is inadequate evidence for the carcinogenicity of toluene in humans. There is evidence suggesting a lack of carcinogenicity to o-toluene in experimental animals. The International Agency for Research on Cancer (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 designated this chemical as not classifiable as a human carcinogen (A4). The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

MEK: A mortality study of 446 people who had worked at MEK dewaxing plants concluded that there was no evidence of a cancer hazard. The average follow-up was 14 years. This study is limited by the small size of the cohort and the relatively short follow-up period. Therefore, it does not necessarily prove that MEK is not a carcinogen. There is no other 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 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)

Xylene: Xylene has been mentioned as an exposure in 4 case-control studies. Cancers at most sites were not significantly associated with xylene exposure in any study. Most results were based on small numbers, most studies involved exposure to other potentially harmful substances, and the consistency of findings is weak. Therefore, the International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of xylene in humans. No conclusions can be drawn from the available animal information. The International Agency for Research on Cancer (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 designated this chemical as not classifiable as a human carcinogen (A4). The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY:

PGMEA: Animal studies have shown that the chemically-similar PGME has no teratogenic or embryotoxic effects. Thus, none are expected for PGMEA. (1)

Toluene: Toluene is a developmental toxicity hazard, based on information obtained from animal studies. Fetotoxicity (reduced foetal weight), behavioural effects (effects on learning and memory) and hearing loss (in males) have been observed in the offspring of rats exposed by inhalation to 1200 or 1800 ppm toluene. These effects were observed in the absence of maternal toxicity. A detailed review of toluene and its potential to cause teratogenicity/embryotoxicity in occupational situations has been published. This review concludes that although many occupational studies have evaluated general solvent exposure and pregnancy outcomes, few studies have specifically investigated toluene exposure. Most of these studies have involved exposure to solvents in general or to certain solvent classes, with toluene exposure addressed as a co-exposure or identified as a common exposure in a sub-group. Outcomes of concern included spontaneous abortion (miscarriage) and teratogenicity (congenital malformations). Six studies examined the association of toluene exposure with spontaneous abortions. Four of the six studies were performed on similar groups of Finnish workers, by the same group of researchers, which can reduce overall confidence in the conclusions. Despite this and other limitations (e.g. recall bias, multiple chemical exposures), these studies do provide evidence suggesting there may be an association between occupational toluene exposure and the occurrence of spontaneous abortions. Nevertheless, further research is required before it will be possible to conclude that there is a causal relationship between toluene exposure and an increased incidence of spontaneous abortions. One study has reported an increased incidence particularly toluene. However, it is not possible to draw specific conclusions regarding toluene from this study, because the toluene-specific results were based on a very small number of workers who were exposed to multiple chemicals. Concerns about the potential teratogenicity of toluene in humans have also arisen due to effects (usually renal/urinary) seen in solvent abuse cases (glue-sniffing). These extreme exposures to toluene, as well as other confounding factors such as tobacco and alcohol abuse, are not relevant to occupational situations. (1)

MEK: Some researchers have pointed to a concern that solvent exposure may have led to congenital defects in children born to female workers. One of the solvents mentioned is MEK, but it is not possible to implicate any particular solvent due to the extent of combined exposure. Three animal studies have shown fetotoxicity (skeletal anomalies) at doses which did not produce any or only very slight maternal toxicity. (1)

Xylene: Several human population studies have suggested a link between exposure to organic solvents (including xylene) and increased occurrence of miscarriages or birth defects in children. However, in the majority of cases, there was exposure to a variety of solvents at the same time, exposures were ill-defined, and the number of cases examined was small. Overall, no conclusions can be made on the effects of exposure to xylenes on the unborn child because of the inadequacy of the available information. Xylene (mixed isomers) has produced fetotoxic effects (delayed ossification and behavioural effects) in animals, in the absence of maternal toxicity. Animal information suggests that xylenes are not teratogenic or embryotoxic at exposure levels that are not harmful to the mother. (1)

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

REPRODUCTIVE TOXICITY:

Toluene: No conclusions can be drawn based on the available human information. Reproductive effects have not been observed in animal studies. A review of toluene and its potential to cause reproductive toxicity in workers has been published. Three cross-sectional studies evaluated fertility in women exposed to toluene or in the wives of exposed men. No conclusions can be drawn based on these studies, due to limitations such as selection bias, recall bias, and the fact that the workers were exposed to other potentially harmful chemicals. Another study suggests that menstrual function is not affected by exposure to toluene. Another report describes testicular atrophy and reduced spermatogenesis in one man who abused toluene for 10 years. This extreme exposure situation is not relevant to occupational exposures. (1)

SECTION III. POTENTIAL HEALTH EFFECTS

REPRODUCTIVE TOXICITY: *(continued)*

Xylene: An increase in menstrual disorders has been reported in women exposed to organic solvents such as benzene, toluene and xylenes. It is not possible to attribute these effects to xylenes in particular. The limited animal information available suggests that xylenes do not cause reproductive effects. (1)

IPDI, PGMEA, MEK: No human or animal information is available. (1)

MUTAGENICITY:

Toluene: Results from the available human studies are inconclusive. Both positive and negative results have been obtained in human studies, but no studies were carried out with toluene exposure only, or with adequate control of other factors. Positive results have been obtained in some studies using live animals, but the studies either used an irrelevant route of exposure (intraperitoneal) or there are insufficient details available for evaluation. (1)

MEK: There is no human information available. In vivo animal studies, mammalian in vitro studies and virtually all short-term mutagenicity studies on test cell systems have been negative. (1)

Xylene: There have been a few studies investigating the mutagenic potential of mixed xylenes (undefined composition) in workers exposed occupationally. In one study, xylene contained ethylbenzene, and in the other there was co-exposure to other solvents including benzene. These studies (induction of sister chromatid exchanges and chromosomal aberrations in human lymphocytes [white blood cells]) were negative. Negative results were also obtained in a study where volunteers were exposed to 40 ppm mixed xylenes over two weeks. However, no conclusions can be drawn because of limitations such as small study populations and exposure to other chemicals at the same time. There were no increases in chromosome aberrations and sister chromatid exchanges without metabolic activation, in cultured human lymphocytes. (1)

IPDI: No studies are available. (1)

PGMEA: No human or animal information is available.

TOXICOLOGICALLY SYNERGISTIC MATERIALS:

Toluene: Exposure to other solvents such as benzene, xylene and ethanol (alcohol) slows the rate of clearance of toluene from the body, thereby enhancing the toxicity of toluene. (1)

MEK: There are several human case reports of neurological effects resulting from high exposure to MEK in combination with other solvents. Animal studies have confirmed synergism between MEK and ethyl n-butyl ketone, methyl n-butyl ketone, n-hexane, carbon tetrachloride, 2,5-hexanedione and chloroform. Principal target organs involved in toxicological interactions are the nervous system and liver, although the lung has also been implicated. (1)

Xylene: Exposure to related solvents, such as benzene, toluene and ethanol (alcohol) slows the rate of clearance of xylenes from the body, thus enhancing its toxic effects. Exposure to xylene in combination with other solvents has had an additive effect with respect to harming the hearing of rats. (1)

IPDI: No information is available. (1)

PGMEA: No human or animal information is available.

POTENTIAL FOR ACCUMULATION:

IPDI: Information about the absorption, metabolism and excretion of IPDI is limited. Like other isocyanates, it probably does not accumulate. (1)

PGMEA: Does not accumulate. PGMEA is rapidly metabolized to PGME and acetic acid. Animal studies indicate that PGME is rapidly metabolized and eliminated from the body. PGMEA was rapidly and extensively metabolized to propylene glycol monomethyl ether and acetic acid (which is a normal body substance), and eliminated in the same manner as propylene glycol monomethyl ether (in the expired air as carbon dioxide, in the urine and very small amounts in the feces). At very high doses of PGMEA, the acetic acid formed in the hydrolysis, may have adverse effects. (1)

Toluene: Toluene is readily absorbed by inhalation or ingestion and tends to be deposited more in tissues that are fatty or have a rich blood supply (e.g. brain, liver, kidney, fat). There was no evidence of accumulation in rats with repeated inhalation exposure to 300 ppm. Toluene is metabolized in the liver and excreted by the kidneys in the urine. It can also be exhaled unchanged. (1)

Xylene: The three xylene isomers are readily absorbed by inhalation and ingestion and are widely distributed throughout the body. A small amount may be absorbed through the skin. Xylenes are largely broken down by the liver and most of the absorbed material is rapidly excreted in the urine as breakdown products. Small amounts are eliminated unchanged in the exhaled air. There is low potential for accumulation. (1)

MEK: No human or animal information is available.

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 15 minutes. If irritation persists, get immediate medical attention.

SECTION IV. FIRST AID MEASURES

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.

INGESTION:

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 IB (NFPA 30)

EXPLOSION DATA: Sensitivity to mechanical impact: No
Sensitivity to static charge: Can accumulate static charge by flow

FLASH POINT: -6°C

AUTO-IGNITION TEMPERATURE: Not available

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

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. Do not cut, puncture or weld empty containers.

COMBUSTION PRODUCTS:

Toxic and/or irritating gases or fumes may be generated by thermal decomposition or combustion (carbon oxide, nitrogen oxide, trace of hydrocyanic acid, trace of hydrochloric acid, trace of formaldehyde), amine derivatives (including nitrous acids). Toxic and/or irritating gases or fumes can emanate from empty containers when submitted to high temperatures.

FIRE FIGHTING INSTRUCTIONS:

Toxic and/or irritating gases or fumes may be generated by thermal decomposition or combustion. Approach fire from upwind. Evacuate area 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. Wear self-contained breathing apparatus and appropriate protective clothing in accordance with standards. 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:

Dry chemical powder, CO₂, foam.

SECTION VI. ACCIDENTAL RELEASE MEASURES

RELEASE OR SPILL:

Ventilate area. Wear appropriate protective equipment during cleanup. Eliminate all sources of ignition. Shut off source of leak if you can do it without risk. Contain the spill. Absorb with absorbents or cover with dry earth, sand or other non-combustible material and transfer to containers. Sweep or shovel into containers with lids, use clean non-sparking tools to collect absorbed material. Cover and remove to appropriate well-ventilated area until disposal. Do not touch or walk through spilled material. Wash spill area with soap and water. Prevent entry into waterways, sewers, basements or confined areas. Dispose of this product according to environmental regulation.

SECTION VII. HANDLING AND STORAGE

HANDLING:

This product is 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. Tightly reseal all partially used containers. Do not cut, puncture or weld empty containers.

STORAGE:

Store containers upside down in a cool well-ventilated area out of direct sunlight and away from humidity, 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 made from butyl rubber or Teflon.

RESPIRATORY: If the exposure limit 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:	Viscous liquid with solvent odour
ODOUR THRESHOLD:	Not available
VAPOUR DENSITY (air = 1):	Heavier than air
EVAPORATION RATE (ether = 1):	Not available
BOILING POINT (760 mm Hg):	Not available
FREEZING POINT:	Not available
SPECIFIC GRAVITY (H₂O = 1):	> 1
SOLUBILITY IN WATER (20°C):	Insoluble
VOLATILE ORGANIC COMPOUND (V.O.C.) CONTENT:	Not available
VISCOSITY:	Not available

SECTION X. STABILITY AND REACTIVITY

STABILITY:

This material is stable at handling and storage conditions recommended under the section VII.

CONDITIONS OF REACTIVITY:

Avoid excessive heat. Exposed to high temperatures, this product can emit dangerous decomposition products such as fumes, carbon oxide, nitrogen oxide, trace of hydrocyanic acid, trace of formaldehyde, trace of hydrochloric acid.

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: Contact with water/moisture results in the formation of highly flammable and explosive vapours. (2)

INCOMPATIBILITY:

Keep away from oxidizing agent and from highly acid and basic materials to avoid exothermic reactions.

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: Avoid contact with air, water or strong oxidizing/reducing agents. (2)

HAZARDOUS DECOMPOSITION PRODUCTS:

This product slowly reacts with water and cause an emanation of carbonic gas which would lead to pressure increasing in closed container.

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: Carbon (sooty) deposits plus carbon monoxide and dioxide and nitrogen oxides. Incomplete combustion may result in the formation of volatile

HAZARDOUS POLYMERISATION:

None

SECTION XI. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

IPDI: (1)	LC50 (rat):	123-160 mg/m ³ (13.6-17.6 ppm) (4-hour exposure) (aerosol)
	LD50 (oral, male rat):	> 2 500 mg/kg
	LD50 (dermal, male rat):	approx. 1000 mg/kg (4-hour exposure); approx. 500 mg/kg (4-day exposure)
Toluene: (1)	LC50 (inhalation, rat):	7 350 ppm (4-hour exposure)
	LD50 (oral, rat):	2 600-7 500 mg/kg
	LD50 (dermal, rabbit):	12 225 mg/kg
MEK: (1)	LC50 (inhalation, rat):	11 700 ppm (4-hour exposure)
	LD50 (oral, rat):	2 740 mg/kg cited as 3.4 ml/kg
	LD50 (dermal, rabbit):	> 5 000 mg/kg
Xylene: (1)	LC50 (rat):	6 350 ppm (4-hour exposure) (unspecified isomers and ethylbenzene)
	LD50 (oral, rat):	5 400 mg/kg
	LD50 (dermal, rabbit):	12 180 mg/kg; greater than 1 700 mg/kg (mixed xylenes – undefined composition)

PGMEA, Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: No information available.

Effects of Short-Term (Acute) Exposure

INHALATION:

IPDI: IPDI causes respiratory irritation in rats. (1)

Toluene: The major effect of toluene is on the central nervous system (CNS). Studies with rats have shown that up to approximately 1000 ppm causes excitation and increased activity. At approximately 2000 ppm, there is CNS depression with drowsiness, incoordination and unconsciousness. Death at higher concentrations is from respiratory failure. Animal studies have indicated that toluene is not directly toxic to the cardiovascular system. Recovery is rapid following cessation of exposure. Studies indicate no permanent damage to body systems. Studies in rats have shown hearing loss at high frequencies following toluene exposure both by inhalation (threshold concentration between 700 and 1000 ppm) and orally (620 mg/kg/day for 4 weeks). This effect has also been observed in a mouse strain that had a genetic predisposition to hearing loss. (1)

SECTION XI. TOXICOLOGICAL INFORMATION

INHALATION: *(continued)*

MEK: Very high concentrations have produced irritation of the nose and eyes, followed by central nervous system depression with incoordination, unconsciousness, gasping respiration and death. Guinea pigs were exposed to 3,300 to 100,00 ppm for 13.5 hours. No abnormal signs were observed during or following exposure to 3300 ppm for 810 minutes. Exposure to 10,000 ppm produced irritation (2-4 minutes), lacrimation (40 minutes), incoordination (90 minutes) and unconsciousness (240-280 minutes). Gasping respiration was produced during 20 and 180-minute exposures to 33 000 and 100 000 ppm. Death resulted from 45 and 200-minute exposures to 33,000 and 100,000 ppm. Slight congestion of the brain and marked congestion and emphysema of the lungs, liver and kidneys were observed in animals that died during exposure. Animals that survived subsequently recovered. The concentration which reduced the respiratory rate of mice by 50% (RD50) was 10,745 ppm (which was very high compared to other irritants tested). This indicated that MEK is a sensory irritant (causes burning and painful irritation of the nose and eyes) at very high concentrations. (1)

Xylene: The major effect of xylene inhalation is on the central nervous system (CNS). There is initial excitation followed by depression, drowsiness, incoordination and unconsciousness at approximately 2000 ppm. Death at higher concentrations is from respiratory failure due to CNS depression and/or accumulation of fluid in the lungs (pulmonary oedema). Irritation of the respiratory tract, causing a decrease in the respiratory rate, has been reported. The RD50, the concentration which produces a 50% decrease in the respiratory rate of mice, is 2440 ppm. This concentration is expected to produce intolerable eye, nose and throat irritation (sensory irritation) in humans. Behavioural effects such as effects on learned behaviours and avoidance conditioning have been observed in animals following short-term inhalation. Hearing loss, mainly at mid-frequencies, has been observed in rats following short-term exposures (800 ppm and above for 6 weeks or 1450 ppm for 3 days) to xylene. A no-effect level was not determined and reversibility was not assessed. (1)

PGMEA: No information available.

EYE IRRITATION:

PGMEA (rabbit): Somewhat painful and irritating to the eyes. (1)

Toluene: Toluene is a mild eye irritant. In an OECD-compliant test, application of 0.1 ml undiluted toluene produced no to mild irritation in rabbits. Application of 0.1 ml of undiluted toluene in another OECD-compliant test protocol produced slight irritation in rabbits. Application of 0.005 ml of in excess of a 40% solution of toluene caused severe eye injury in rabbits. These results are not consistent with the reports that used undiluted toluene in OECD-compliant tests. The results of this study are therefore questionable. (1)

MEK: Application of 0.005 ml of undiluted methyl ethyl ketone (MEK) to rabbit eyes produced severe irritation. Application of pure, 30%, 10% and 1% solutions of MEK in a standard Draize test using rabbits resulted in moderate/severe irritation for pure MEK and mild irritation for all other concentrations. In an interlaboratory comparison study, where eye irritation was evaluated in rabbits using a standard Draize test, 71% of the laboratories rated MEK as an eye irritant (degree not specified). The corneas of guinea pigs exposed to 10,000 ppm vapour for 30 minutes or more became opaque. In some cases, this effect persisted for the 8 day observation period. (1)

Xylene: Application of xylene caused mild irritation and very slight, transient corneal damage in rabbits. Vapour exposure (unknown concentration) to mixed xylenes (undefined composition) resulted in fine vacuoles in the corneas of cats which disappeared in 24 hours. (1)

SKIN IRRITATION:

IPDI: IPDI caused moderate skin sensitization in guinea pigs. Mice showed statistically significant allergic responses when sensitized with a concentration of 1% IPDI. It was estimated that IPDI was probably equivalent to toluene diisocyanate in sensitizing potential. (1)

PGMEA (rabbit): Repeated applications were not very irritating to rabbit and did not cause absorption of significant amounts, even when applied repeatedly for a 2-week period. (1)

Toluene: Toluene is a moderate skin irritant. In an OECD-compliant test, administration of 0.5 ml of undiluted toluene to intact skin, under a semi-occlusive cover, for 4 hours produced moderate irritation in rabbits. Another OECD-compliant test, showed slight irritation in rabbits following the application of 0.5 ml of undiluted toluene for 4 hours. There is insufficient information provided to properly evaluate these test results. Other test protocols have shown moderate irritation in intact and abraded skin, with prolonged exposure (23 hours), and in a study that does not strictly meet OECD guidelines. Application of 0.5 ml of undiluted toluene for 4 hours, to intact and abraded skin, produced moderate irritation in rabbits. Application of 0.5 ml of undiluted toluene for 23 hours, to intact and abraded skin, produced moderate irritation in rabbits. Application of 0.01 of undiluted toluene produced moderate irritation in rabbits. (1)

MEK: Application of 0.01 ml of undiluted MEK to the clipped rabbit skin for 24 hours (uncovered) resulted in mild irritation. Application of full strength MEK to intact or abraded rabbit skin for 24 hours under occlusion was moderately irritating. In an interlaboratory comparison study, where skin irritation was evaluated in rabbits by covered application of 0.5 ml to shaved skin for 24 hours, over 70% of the laboratories rated MEK as a mild skin irritant. MEK did not produce sensitization in the mouse ear thickness test. (1)

Xylene: A single application of an unspecified amount of xylenes (unspecified composition) caused irritation and swelling in rabbits and guinea pigs. Application of 0.5 ml of the xylene mixture (unspecified composition) to rabbit skin for 24 hours caused moderate irritation. Repeated application, 10-20 times over a 2 to 4-week period, of mixed xylene to rabbit skin caused moderate to marked irritation, swelling and tissue death. (1)

SECTION XI. TOXICOLOGICAL INFORMATION

Effects of Long-Term (Chronic) Exposure

INHALATION:

PGMEA (rat, mouse): Repeated exposures at 300 and 1000 ppm for two weeks (6 hours/day, 5 days first week, 4 days second week) produced no adverse effects. There were minor changes found at very high exposures (3000 ppm) – slight increase in liver weight for females, slight effect on kidney function and slight to moderate injury to the lining of the nose. The latter effect was more severe with mice. It was suggested that this effect was related to acetic acid resulting from hydrolysis of PGMA in the nose. There were no effects on thymus and spleen weights, on bone marrow or blood. (1)

Toluene: Daily inhalation by rats of toluene concentrations below 400 ppm for up to 24 months resulted in no significant toxicity. Evidence for chronic CNS neurotoxicity is inconclusive. Numerous studies on rats and mice have shown reduced performance on some neurobehavioral tests but not others, both during and after toluene inhalation exposures (usually at greater than 500 ppm). Where tests were repeated after an exposure-free period, most results were the same as controls. The significance of minor changes in brain cells or in behavioural tests is not known. (1)

MEK: Exposure to 5000 ppm for 13 weeks produced an exposure-related effect on body and liver weights in male and female rats, as well as a depression in brain weight in females. Guinea pigs and rats were exposed to 235 ppm for 12 weeks (5 days/week, 7 hours/day). There were no deaths nor signs of intoxication for rats. There were deaths in both control and experimental guinea pigs (2 in each group). Extensive neurological studies with high exposures have shown no effects. In one study, rats were initially exposed to 10 000 ppm which was reduced to 6000 ppm due to severe irritation of the upper respiratory tract. Temporary signs of muscle incoordination and gait disturbances were observed throughout the exposure. Exposures continued for only 7 of the planned 15 weeks since animals died of bronchopneumonia with no neurological symptoms. In the other study, rats were exposed to 1125 ppm continuously for up to 55 days with no neurotoxicity. (1)

INGESTION:

PGMEA (rat): A single dose of 3 ml/kg produced no deaths; 10 ml/kg caused death in 3 of 5 animals tested. (1)

Toluene: No significant toxicity was seen after oral administration of up to 590 mg/kg to female rats for up to six months. (1)

MEK: Exposure of mice in LD50 studies has resulted in incoordination, unconsciousness, respiratory depression and death. MEK is easily aspirated into the lungs. When aspiration of MEK was induced in 6 rats, there was a high mortality with rapid onset. (1)

TARGET ORGANS:

Xylene: In general, animal studies have provided little evidence of damage to the liver, kidney or lungs, nor any other significant long-term health effects following long-term inhalation. No effects were observed following exposure of rats or dogs to mixed xylenes up to 810 ppm, 6 hours/day for 13 weeks. Some studies have shown subtle, reversible blood effects at concentrations above 1000 ppm. However, xylenes have not been shown to cause benzene-like cancer of the blood. No important findings were observed following oral administration of 1000 mg/kg (rats) and 2000 mg/kg (mice) of mixed xylenes for 90 days. Similarly, only reduced body weight was observed in male rats fed 500 mg/kg of the same mixed xylene for 103 weeks. No significant effects were noted in mice fed up to 1000 mg/kg for 103 weeks. (1)

CARCINOGENICITY:

Toluene: The International Agency for Research on Cancer (IARC) has concluded there is inadequate evidence for the carcinogenicity of toluene in experimental animals. Toluene was not carcinogenic in mice and rats exposed by inhalation to up to 1200 ppm for 24 months. (1)

Xylene: Oral studies of mixed xylenes in rats (up to 500 mg/kg for 103 weeks) and mice (up to 1000 mg/kg for 103 weeks) found no treatment-related increase in the incidence of tumours. In another carcinogenicity study, xylene (unspecified composition) was administered to rats (up to 500 mg/kg for 104 weeks). The reporting of this study was so poor that it is not possible to evaluate the results. A number of studies have investigated whether exposure to xylenes causes skin cancer. The conduct and reporting of these studies do not allow any conclusions to be drawn. The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for carcinogenicity of xylene in animals. (1)

PGMEA, MEK: No information available.

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY:

Toluene: Toluene does cause developmental effects in animals, based on fetotoxicity (reduced foetal weight), behavioural effects (effects on learning and memory) and hearing loss (in males) observed in the offspring of rats exposed by inhalation to 1200 or 1800 ppm toluene. These effects were observed in the absence of maternal toxicity. Rats (16/group) were exposed to 1800 ppm toluene or clean air on days 7-20 of pregnancy. The dose was targeted so as not to induce marked toxicity in the mothers and no toxicity was seen. Fetotoxicity, as evidenced by reduced birth weight, was observed in the offspring. (1)

MEK: One rat study indicated that fetotoxicity (skeletal anomalies) occurred at 1000 ppm. This study also points to teratogenicity at a higher dose (3000 ppm). Maternal toxicity was not produced at either dose. Two follow-up studies by the same researchers also showed fetotoxicity in rats and mice in the presence of very slight maternal toxicity. Rats were exposed by inhalation to 0, 1000 and 3000 ppm on days 6 to 15 of gestation. At 3000 ppm in 4/21 litters (1 foetus/litter), there was a low but statistically significant increase in malformations. Sternebral and soft tissue anomalies were also increased. There was also a statistically significant increase in total skeletal anomalies at 1000 ppm. Maternal toxicity was not observed. In subsequent studies, rats and mice were exposed to 0, 400, 1000 or 3000 ppm by inhalation during days 6 to 15 of gestation. There were no embryotoxic or teratogenic effects at any exposure level. At the 3000 ppm, there were fetotoxic effects (increased incidence of minor skeletal variations; delayed bone formation; reduced foetal weight) with very slight maternal toxicity (decreased weight gain in rats; increased liver weights in mice). (1)

SECTION XI. TOXICOLOGICAL INFORMATION

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY: (continued)

Xylene: In three studies, fetotoxic effects (delayed ossification and behavioural effects) were observed in the offspring of rats exposed by inhalation to 500 ppm mixed xylenes with up to 20% ethylbenzene. In another study, fetotoxicity (decreased weight) was observed in the female offspring of rats exposed to up to 500 ppm of mixed xylenes (12.8% ethylbenzene). No signs of maternal toxicity were observed in these studies. In other studies where rats and mice were exposed by inhalation or ingestion, harmful effects in the offspring (teratogenicity, embryotoxicity and/or fetotoxicity) were either not observed or were observed in the presence of significant harmful effects in the mothers. Some other studies have not been evaluated because of significant study design limitations for example, poor reporting of exposure details and/or effects, and inadequate evaluation of material toxicity. (1)

PGMEA: No information available.

REPRODUCTIVE TOXICITY:

Toluene: No adverse effects on reproduction were observed in several studies on both rats and mice, even at maternally toxic exposures. Two generations of mice exposed intermittently by inhalation to 2000 ppm (6 hours/day, 7 days/week) had no reproductive effects. (1)

Xylene: No harmful reproductive effects were noted in males or females when rats were exposed to up to 500 ppm mixed xylenes in a single generation study. No firm negative conclusions can be drawn from this study because the maximum tolerated dose may not have been achieved. Ingestion of mixed xylenes for up to 2 years caused no observable adverse effects in the reproductive organs of male and female rats (up to 500 mg/kg/day) or mice (up to 1000 mg/kg/day). (1)

PGMEA, MEK: No information available.

MUTAGENICITY:

Toluene: There is insufficient information available to conclude that toluene is mutagenic. There is some evidence that toluene can cause chromosome damage in vivo when administered to mice by injection, although conflicting results have been obtained and this route of exposure is not considered relevant to occupational situations. Negative results were obtained following oral administration. There is one report of positive results (chromosomal aberrations) in the bone marrow cells of rats exposed by inhalation. Insufficient details are available in English to evaluate this report. Positive and negative results have been obtained in tests using cultured mammalian cells. Negative results have been obtained in tests using bacteria. Positive and negative results have been obtained in fruit flies. (1)

MEK: MEK was not mutagenic in in vivo micronucleus cytogenetic assays with mice injected with 1.96 ml/kg or hamsters injected with 411 mg/kg. It also did not produce chromosomal aberrations or sister chromatid exchanges in Chinese hamster ovary cells. MEK was not mutagenic in several cultured mammalian test systems in vitro, including human lymphocytes, both with and without metabolic activation. MEK was not mutagenic in Salmonella typhimurium, Escherichia coli and Saccharomyces cerevisiae, both with and without metabolic activation. In two other studies with Saccharomyces cerevisiae yeast, MEK gave positive results. (1)

Xylene: Negative results have been consistently obtained in a variety of studies using live animals and cultured cells. Mixed xylenes (undefined compositions) gave negative results in a number of bacterial assays, with and without metabolic activation. Negative results were obtained in a variety of tests live animals exposed by a number of exposure routes. Tests for chromosome damage in rats and mice (both bone-marrow cytogenetics and micronucleus) (by oral, injection and inhalation routes) were negative. Negative results were also obtained in dominant lethal assays in rats and mice following administration by injection of adequate maximum doses. (1)

PGMEA: No information available.

SECTION XII. ECOLOGICAL INFORMATION

ENVIRONMENTAL EFFECTS:

Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial regulations 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 listed as hazardous waste. Consult local, state, provincial or territory authorities to know disposal methods. Also listed as hazardous waste by the RCRA (USA); waste disposal as to follow EPA regulations. Do not dispose of waste with normal garbage or sewers systems.

SECTION XIV. TRANSPORT INFORMATION

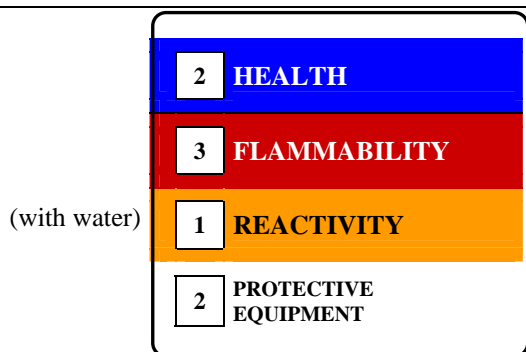
NAME OF PRODUCT:	Alsan 500 FT	IDENTIFICATION NUMBER:	UN 1263
CLASSIFICATION (TDG - DOT):	Class 3	SHIPPING NAME:	Paint
CONTAINERS FOLLOW THE STANDARDS OF:		PACKING GROUP:	II
Canada:	CAN / CGSB-43.150-97		
USA:	CFR 49 parts 100 to 199		

SECTION XV. REGULATORY INFORMATION

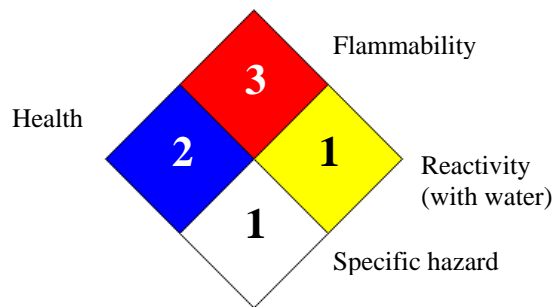
Canada - WHMIS: Class B2: Flammable material (flash point lower than 37.8°C).
 Class D1A: Very toxic material causing severe and immediate effects.
 Class D2A: Very toxic material causing other toxic effects.
 Class D2B: Toxic material causing other effects.

Canada - DSL: All constituents of this product are included on the Domestic Substances List (DSL – Canada).
USA - TSCA: All constituents of this product are included on the Toxic Substances Control Act Inventory (TSCA – United States).

HMIS (USA):



NFPA (USA):



SECTION XVI. OTHER INFORMATION

Glossary:

- ACGIH:** American Conference of Governmental Industrial Hygienists
- ANSI:** American National Standards Institute
- ASTM:** American Society for Testing and Materials
- CAS:** Chemical Abstract Services
- CFR:** Code of Federal Regulations (United States)
- CSA:** Canadian Standardisation Association
- DOT:** Department of Transportation (United States)
- DSL:** Domestic Substances List (Canada)
- EPA:** Environmental Protection Agency (United States)
- HMIS:** Hazardous Material Information System
- IARC:** International Agency for Research on Cancer
- LC50:** (Lethal concentration₅₀) Concentration of a substance in air that causes dead of 50% mortality of a defined animal population
- LD50:** (Lethal dose₅₀) Single dose of a substance that, when administrated by a define route in an animal assay, is expected to cause the death of 50% of a defined animal population.
- NFPA:** National Fire Protection Association (United States)
- NIOSH:** National Institute for Occupational Safety and Health
- NTP:** National Toxicology Program
- OSHA:** Occupational Safety & Health Administration (United States)
- PEL:** Permissible Exposure Limit
- RCRA:** Resource Conservation and Recovery Act (United States)
- RTECS:** Registry of Toxic Effects of Chemical Substances
- TDG:** Transportation of Dangerous Goods
- TLV:** Threshold Limit Value
- TWA:** Time-weighted average
- TSCA:** Toxic Substances Control Act (United States)
- WHMIS:** Workplace Hazardous Materials Information System (Canada)

References:

- (1) CHEMINFO (2007) Canadian Centre or Organisational Health and Safety, Hamilton (Ontario) Canada
- (2) Material Safety Data Sheet of the supplier

This MSDS has been prepared by: Michel Galtier
For information: SOPREMA Canada 1-800- 567-1492

The Material Safety Data Sheets of Soprema are available on Internet at the following site: <http://www.soprema.ca>

Justification of the update:

- Modification of the Composition. (Section II)

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.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier or any of its subsidiaries assumes any liability whatsoever for the accuracy or 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.