


MATERIAL SAFETY DATA SHEET

ALSAN H80

Disponible en français

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

SECTION I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name: Alsan H80
Use: Waterproofing polyurethane primer mono-component.

Code of MSDS: CA U DRU SS FS 047
Formula Number : 539.1
Revision date: December 13, 2007
Revised by: Michel Galtier, Health and Safety Supervisor
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In case of emergency:

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|---|-----------------------------------|
| SOPREMA (8:00am to 5:00pm – Eastern time): | (800) 567-1492 |
| CANUTEC (Canada) (24h.): | (613) 996-6666 |
| CHEMTREC (USA) (24h.): | (800) 424-9300 |
| Poison Control Centre: | Consult local telephone directory |

EMERGENCY OVERVIEW!!!

DANGER! Highly flammable liquid and vapours. The vapours are heavier than air and may spread long distances. Distant ignition (such as a pilot light, and any object that sparks, such as an electric motor) and flash back are possible.

Harmful if inhaled. May cause irritation to eyes, skin and respiratory tract. Harmful or fatal if swallowed. Ingestion of the product can cause severe lung injury when aspirated. May cause cancer. May cause allergic or asthmatic symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. Inhalation of high concentrations of this product may cause central nervous system (CNS) depression (headache, nausea, dizziness, drowsiness, incoordination and unconsciousness).

This product contains a chemical known to the state of California to cause cancer.

SECTION II. COMPOSITION AND INFORMATION ON DANGEROUS INGREDIENTS

| NAME | CAS # | % WEIGHT | EXPOSURE LIMIT (ACGIH) | |
|---|-----------|----------|---------------------------|-----------------|
| | | | TLV-TWA | TLV-STEL |
| Diphenylethane diisocyanate (MDI) | 101-68-8 | 30-60 | 0.005 ppm | Not established |
| Methyl ethyl ketone (MEK) | 78-93-3 | 15-40 | 200 ppm | 300 ppm |
| 1-methoxy-2-propanol acetate (PGMEA) | 108-65-6 | 10-30 | 50 ppm | Not established |
| [3-(2,3-Epoxypropoxy) propyl] trimethoxysilane | 2530-83-8 | 0.1-1 | Not established | Not established |
| Benzoyl Chloride | 98-88-4 | 0.1-1 | 0.5 ppm | 1 ppm |

SECTION III. POTENTIAL HEALTH EFFECTS

Effects of Short-Term (Acute) Exposure

INHALATION:

MEK: Brief (3-5 minutes) exposures to methyl ethyl ketone vapours produced slight nose and throat irritation at 100 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 methyl ethyl ketone (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 methyl ethyl ketone for 4 hours/day for 4 days. Minor disturbances in time perception were observed. (1)

PGMEA: Propylene glycol monomethyl ether acetate (PGMMEA) does form a vapour at normal temperatures. High vapour or mist concentrations may irritate the eyes and nose, based on animal information and comparison to propylene glycol monomethyl ether. Very high concentrations may cause central nervous system depression, with symptoms such as headache, nausea and dizziness. One case report an employee described dizziness, headache, and "general illness" after filling a tank with a resin containing PGMMEA. Exposures to PGMMEA ranged from 0.9-15.9 ppm. Propylene glycol monomethyl ether concentrations were less than 0.2 ppm. There are insufficient details available to evaluate this report. (1)

MDI: MDI has a very low vapour pressure. Therefore, airborne exposures are unlikely to occur unless MDI is heated or forms 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. Some people may become sensitized to MDI--see Effects of Long-term (Chronic) Exposure for information. 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)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Vapour generated at ambient temperature should not cause any harmful health effect at short term. Nevertheless this product can form methanol in case of hydrolysis. Vapours of methanol may cause dizziness, drowsiness, visual troubles and also tingling, numbing and lancinating pains to hands and forearms. May cause a sensitization by inhalation. (2)

SKIN CONTACT:

MEK: Methyl ethyl ketone is expected to cause no or mild irritation. No irritation was produced when 20% methyl ethyl ketone in petrolatum was applied to volunteers for 48 hours in a closed patch test. Animal studies indicate that methyl ethyl ketone is a mild skin irritant. (1)

PGMEA: PGMMEA is not a skin irritant, based on animal information. No human information was located. PGMMEA can be absorbed through the skin, but harmful effects are not expected by this route of exposure. (1)

MDI: MDI can cause moderate irritation. Isocyanates, in general, can cause skin discolouration (staining) and hardening of the skin after repeated exposures. Skin sensitization, resulting in dermatitis, may occur in some individuals. Skin contact is not expected to result in the absorption of harmful amounts. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Causes a minor irritation. Causes the following effects: local malaise and redness. An increase of skin pigmentation can occur. (2)

Benzoyl Chloride: Benzoyl chloride is corrosive to skin based on animal information and because it reacts violently with moisture to produce heat, benzoic acid and hydrogen chloride gas, and with air to form corrosive fumes. Corrosive materials are capable of producing severe burns, blisters, ulcers and permanent scarring, depending on the concentration of the solution and the duration of contact. No human information was located. (1)

SKIN ABSORPTION:

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Prolonged and extended should not cause absorption of potentially harmful amounts of product. (2)

SECTION III. POTENTIAL HEALTH EFFECTS

EYE CONTACT:

MEK: Animal evidence suggests that methyl ethyl ketone is a moderate to severe eye irritant. There is one human case report of an industrial splash of methyl ethyl ketone into the eye. The next day there was only slight eye irritation with no permanent injury. Later, severe inflammation of the eye developed which required intensive treatment. The author speculated that the delayed irritation may have been triggered by slight trauma. Methyl ethyl ketone vapour is irritating to the eyes. Brief (3-5 minutes) exposure to methyl ethyl ketone vapours produced mild eye irritation in some people at 200 ppm, while the majority experienced eye irritation at 350 ppm. Momentary exposure to 3,300 and approximately 10,000 ppm produced intolerable eye irritation in men. 100 ppm was intolerable after "several inhalations" and 330 ppm was moderately irritating. (1)

PGMEA: PGMMEA may be a slight to moderate eye irritant, based on animal information. No human information was located. (1)

MDI: Contact with MDI liquid, mist and aerosols may cause slight irritation with tearing and discomfort. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Cause a light irritation. Causes the following effects: malaise, pain, excessive blinking of the eyes, watering of the eyes, excessive and marked redness at the conjunctiva, swelling at the conjunctiva. (2)

Benzoyl Chloride: Benzoyl chloride is corrosive to eyes based on animal information and because it reacts violently with moisture to produce heat, benzoic acid and hydrogen chloride gas, and with air to form corrosive fumes. Corrosive materials are capable of producing severe eye burns, and permanent injury, including blindness, depending on the concentration of the solutions and duration of contact. No human information was located. (1)

INGESTION:

MEK:

Unintentional, non-occupational ingestion of methyl ethyl ketone produced unconsciousness and hyperventilation in a woman. Severe lactic acidosis was apparent upon admission to the hospital but the authors were not certain whether methyl ethyl ketone or circulatory insufficiency caused this effect. Ingestion of methyl ethyl ketone is 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. Animal evidence suggests that methyl ethyl ketone can be aspirated (inhaled) into the lungs during ingestion or vomiting. Aspiration of even a small amount of liquid could result in a life threatening accumulation of fluid in the lungs. Severe lung damage (oedema), respiratory failure, cardiac arrest and death may result. (1)

PGMEA: PGMMEA has very low oral toxicity based on animal information. No human information was located. Ingestion is not a typical route of exposure. (1)

MDI: There have been no reports of human ingestion of MDI. Animal studies indicate that the toxic effects of the ingestion of MDI are slight. Ingestion could result in irritation and corrosion of the mouth, throat, and digestive tract. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: This product hydrolyzes in the stomach to form methanol. May cause nausea, abdominal pains, vomiting, headaches, dizziness, shortness of breath, weakness, fatigue, leg cramps, agitation, confusion, behaviour of drunk person, visual troubles, drowsiness, coma and death. There can be a delay of many hours between ingestion of methanol and appearance of signs and symptoms. The observed effects were partly caused by the acidosis and partly by cerebral oedema. The visual effects consist of: a blurred vision, a diplopia, a change in the colour perception, a restriction of the visual field and a total blindness. Ingestion of moderate amounts of methanol also produces a metabolic acidosis. Appearance of symptoms can occur 48 hours after ingestion. A dose of 60-200 ml of methanol is fatal for most of adults. Ingestion of amounts as low as 10 ml caused blindness. Massive overdoses can cause liver, kidney and myocardium injuries. (2)

Effects of Long-Term (Chronic) Exposure

PGMEA: Based on its similarity and metabolism to the chemically related propylene glycol methyl ether, PGMMEA is not expected to produce harmful effects following long-term exposure. (1)

INHALATION:

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Long-term repeated overexposure at concentrations of methanol vapours of 3000 ppm or more may cause a cumulative effect causing nausea, vomiting, headaches, buzzing ears, insomnia, trembling, unsteady gait, dizziness, blurred vision and diplopia. Liver and/or kidney injuries can occur. Prolonged overexposure to concentrations of 800 and 1000 ppm can cause severe ocular injuries on certain persons. (2)

LUNGS/RESPIRATORY SYSTEM:

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

NERVOUS SYSTEM:

MEK: Epidemiological studies and case reports have shown nervous system effects in workers exposed to solvents, including methyl ethyl ketone, over a prolonged period of time. It is not possible to associate the observed effects with any particular chemical. (1)

RESPIRATORY SENSITIZATION:

MDI: Respiratory sensitization has developed in people working with 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

SECTION III. POTENTIAL HEALTH EFFECTS

RESPIRATORY SENSITIZATION:

MDI (continued): 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 MDI 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 MDI. Others may recover fully and may gradually lose their sensitivity within several years. MDI may also cause hypersensitivity pneumonitis, another allergic lung disease, which is characterized by symptoms such as shortness of breath, fever, tiredness, non-productive cough, and chills. Several studies have shown that continued exposure to low levels of MDI and other isocyanates may cause impaired lung function, such as diminished respiratory capacity. Other studies have shown that extremely low levels of MDI (e.g. less than 0.003 ppm) do not decrease lung function. Cross-sensitization between different isocyanates may occur. People sensitized to toluene diisocyanate (TDI) or hexamethylene diisocyanate (HDI) may show sensitization to MDI, without having previous exposure to this chemical. (1)

SKIN:

MEK: Repeated or prolonged contact can produce dermatitis (red, dry, itchy skin) and whitening of the skin. (1)

PGMEA: Repeated or prolonged contact may cause skin irritation, based on animal information. (1)

SKIN SENSITIZATION:

MEK: Methyl ethyl ketone is not an occupational skin sensitizer. Despite extensive industrial use, there is only one case report of sensitization in a painter which was confirmed by positive response to standard patch testing with methyl ethyl ketone. A maximization test using 20% methyl ethyl ketone in petrolatum produced no sensitization in 24 volunteers. (1)

PGMEA: PGMMEA is not a skin sensitizer, based on unconfirmed animal information. No human information was located. (1)

MDI: Allergic contact dermatitis has developed from occupational contact with MDI. It has been proposed that a break-down (hydrolysis) product of MDI, 4,4'-methylene dianiline (MDA), is the real allergen rather than MDI. Following occupational contact with MDI, 3 of 4 people showed reaction to MDA as well as MDI, while one showed reaction to MDA only. (1)

CARCINOGENICITY:

MEK: A mortality study of 446 people who had worked at methyl ethyl ketone 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 methyl ethyl ketone 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)

PGMEA: No human or animal information was located. 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)

MDI: 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. There is one isolated report of a non-smoking painter who developed lung cancer after being exposed to MDI and TDI for 15 years. He also had a 10-year history of lung disease thought to be caused by exposure to MDI and TDI. It is not possible to draw any conclusions from this case report. The International Agency for Research on Cancer (IARC) has determined there is inadequate evidence for the carcinogenicity of MDI or polymeric MDI in humans. There is limited evidence for the carcinogenicity of a mixture containing MDI and polymeric MDI 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 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)

Benzoyl Chloride: Small human population studies have shown an increase in lung cancers in employees with combined exposure to benzoyl chloride and alpha-chlorinated toluenes. The International Agency for Research on Cancer (IARC) has determined that there is limited evidence for the combined exposure of alpha-chlorinated toluenes and benzoyl chloride to humans. There is inadequate evidence for the carcinogenicity of benzoyl chloride to experimental animals. The International Agency for Research on Cancer (IARC) has concluded that this chemical is probably carcinogenic to humans (Group 2A). Combined exposures to alpha-chlorinated toluenes and benzoyl chloride. 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:

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 methyl ethyl ketone, but it is not possible to implicate any particular solvent due to the extent of combined exposure. Animal studies have shown slight fetotoxicity (e.g. skeletal anomalies, reduced foetal weight) at concentrations that produced mild maternal toxicity. (1)

PGMEA: The commercial product has not caused developmental toxicity in animal studies, even in the presence of maternal toxicity, and, therefore, is not considered a developmental toxin. Based on research on propylene glycol monomethyl ether, the potential for developmental effects occurring following exposure to commercial PGMMEA is considered low. (1)

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

SECTION III. POTENTIAL HEALTH EFFECTS

REPRODUCTIVE TOXICITY:

MEK: No human or animal information available. (1)

PGMEA: The available information does not suggest that PGMMEA causes reproductive toxicity. No human or animal information was located for PGMMEA. In animal studies using commercial propylene glycol monomethyl ether, a closely related chemical, reproductive toxicity was not observed in the absence of significant other toxicity in the test animals. (1)

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

MUTAGENICITY:

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)

PGMEA: No human or animal studies were located. Negative results were obtained in tests using cultured mammalian cells and bacteria, suggesting that PGMMEA is not mutagenic. (1)

MDI: In one case report, MDI caused DNA damage in human white blood cells after inhalation exposure to 5 to 20 ppb. This report provides insufficient information for determining the mutagenicity of MDI. No other human or animal in vivo studies have been reported. MDI induced chromosome aberrations in cultured human lymphocytes, with and without metabolic activation. It only marginally increased sister chromatid exchanges at a high dose, with and without metabolic activation. (1)

TOXICOLOGICALLY SYNERGISTIC MATERIALS:

MEK: There are several human case reports of neurological effects resulting from high exposure to methyl ethyl ketone in combination with other solvents. Animal studies have confirmed synergism between methyl ethyl ketone 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)

PGMEA, MDI: No information was located. (1)

POTENTIAL FOR ACCUMULATION:

MEK: Methyl ethyl ketone does not accumulate in the body. It is rapidly absorbed by inhalation, skin contact and ingestion and transferred into the blood and other tissues. Methyl ethyl ketone is metabolized in the liver, mainly to 3-hydroxy-2-butanone and 2,3-butanediol which are eliminated in urine. Most methyl ethyl ketone probably enters the general metabolism in the body and is converted to acetate which is eventually broken down to carbon dioxide and water which are then eliminated in exhaled air and urine. Small amounts of methyl ethyl ketone itself are also eliminated in exhaled air and urine. Methyl ethyl ketone and its metabolites are mostly cleared from the body within 24 hours. (1)

PGMEA: Does not accumulate. In rats exposed by inhalation or ingestion, PGMMEA was rapidly metabolized to propylene glycol monomethyl ether (PGMME), propylene glycol, sulfate and glucuronide conjugates of PGMME and acetic acid (a normal body substance). The metabolites of PGMMEA are largely eliminated in the urine and expired air (as carbon dioxide). (1)

MDI: 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)

HEALTH COMMENTS:

PGMEA: PGMMEA rapidly hydrolyses to propylene glycol methyl ether once absorbed into the body. Thus, PGMMEA is expected to produce similar effects to propylene glycol methyl ether, except it is more irritating at the site of contact. Refer to the CHEMINFO review of propylene glycol methyl ether for additional information. (1)

MDI: In many reports it is not clear whether pure MDI or polymeric MDI (PMPPI (polymethylene polyphenyl isocyanate), commonly about 50% MDI) was being used. In addition, problems with common airborne MDI sampling methods may affect the interpretation of laboratory and workplace exposure studies. (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 15 minutes. If irritation persists, get immediate medical attention.

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

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| 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: | -5°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:

Irritating and/or toxic gases or fumes may be generated by thermal decomposition or combustion. Toxic and/or irritant gases or fumes can emanate from empty containers when submitted to high temperatures. Combustion of this product may release: gaseous hydrocarbons, 1-methoxy-2-methylethylene (vinyl ether), acetic acid, hydrogen gas and carbon monoxide, carbon dioxide, and carbonyl compounds such as formaldehyde, acetaldehyde, methylglyoxal, nitrogen oxides, hydrogen cyanid and other irritating and toxic fumes.

FIRE FIGHTING INSTRUCTIONS:

Irritating and/or toxic 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. 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 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 highly flammable and very 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 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

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|----------------------------|---|
| 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 |
| ODOUR THRESHOLD: | Not available |
| VAPOUR PRESSURE (20°C): | < 110 kPa |

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

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|--|------------------|
| 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: | 523 g/L |
| VISCOSITY: | Not available |

SECTION X. STABILITY AND REACTIVITY

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|---|
| 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. |
| INCOMPATIBILITY: Keep away from oxidizing agents and from highly acid and basic materials to avoid exothermic reactions. |
| HAZARDOUS DECOMPOSITION PRODUCTS: This product reacts with water and causes an emanation of carbonic gas which would lead to pressure increasing in closed containers. |
| HAZARDOUS POLYMERISATION: None |

SECTION XI. TOXICOLOGICAL INFORMATION

| | | |
|---|------------------------------|---|
| TOXICOLOGICAL DATA: | | |
| MEK: (1) | LC50 (male rat): | 11300 ppm (4-hour exposure) |
| | LD50 (oral, adult male rat): | 2740 mg/kg; cited as 3.4 ml/kg |
| | LD50 (dermal, rabbit): | > 5000 mg/kg |
| PGMEA: (1) | LC50 (rat): | greater than 5320 ppm (4-hour exposure) |
| | LD50 (oral, female rat): | 8532 mg/kg |
| | LD50 (dermal, rabbit): | > 5000 mg/kg |
| MDI: (1) | LC50 (male rat): | 369 mg/m ³ ; 4-hour exposure |
| | LD50 (oral, rat): | > 10000 mg/kg |
| | LD50 (dermal, rabbit): | > 10000 mg/kg |
| [3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: (2) | LD50 (rat): | > 24 000 mg/kg |
| | LD50 (rabbit): | > 4 000 mg/kg |
| Benzoyl Chloride: (1) | LC50 (rat): | 230 ppm (4-hour exposure); cited as 1.87 mg/L (2-hour exposure) |
| | LD50 (oral, rat): | 1900 mg/kg |
| | LD50 (dermal, rabbit): | 790 mg/kg |
| EYE IRRITATION: | | |
| MEK: In an interlaboratory comparison study, where eye irritation was evaluated in rabbits using a standard Draize test, 71% of the laboratories rated methyl ethyl ketone as an eye irritant (degree not specified). (1) | | |
| PGMEA: PGMMEA may be a slight to moderate eye irritant. (1) | | |
| MDI: Methylene diphenyl diisocyanate (MDI) has been reported to cause slight eye irritation in rabbits. (1) | | |
| Benzoyl Chloride: Benzoyl chloride is corrosive. Application of 0.1 ml of benzoyl chloride was corrosive in rabbits. No scoring information was provided.(1) | | |
| SKIN IRRITATION: | | |
| MEK: 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 methyl ethyl ketone as a mild skin irritant. (1) | | |
| PGMEA: PGMMEA is not irritating to the skin. Application of 0.5 ml PGMMEA was not irritating to rabbit skin after a 4-hour contact, under cover. (1) | | |
| MDI: Application of 0.5 ml MDI (under a cover for 24 hours) caused slight (92 to 94% MDI) to moderate irritation (95% MDI) in rabbits. (1) | | |
| Benzoyl Chloride: Prolonged exposure (24-hour) to benzoyl chloride caused corrosion. Application of 0.5 ml benzoyl chloride, under a cover for 24 hours, was corrosive to the ears of rabbits. No scoring information was provided. (1) | | |

SECTION XI. TOXICOLOGICAL INFORMATION

Effects of Short-Term (Acute) Exposure

PGMEA: PGMMEA has low short-term toxicity following inhalation, skin contact or ingestion. (1)

INHALATION:

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. Methyl ethyl ketone is a sensory irritant (causes burning and painful irritation of the nose and eyes) at very high concentrations. (1)

PGMEA: No adverse effects were noted in rats following a single 6-hour exposure to a saturated vapour concentration of PGMMEA (greater than 4345 ppm). High dose animals showed some changes in their blood chemistry. (1)

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. The overall effect was a decline in respiratory rate which was determined to be due mainly to MDI's action as a pulmonary irritant. The RD50 (concentration required to reduce the respiratory rate by 50%) was 32 mg/m³. (1)

SKIN CONTACT:

PGMEA: Repeated application of an unspecified dose of PGMMEA for 2 weeks caused slight redness and exfoliation in rabbits. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Irritating. Moderate rash in rabbit. (2)

EYE CONTACT:

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Irritating. Severe injuries of the eyes of rabbit. (2)

INGESTION:

MEK: Exposure of mice in LD50 studies has resulted in incoordination, unconsciousness, respiratory depression and death. Methyl ethyl ketone is easily aspirated into the lungs. When aspiration of methyl ethyl ketone was induced in 6 rats, there was a high mortality with rapid onset (4/6). (1)

PGMEA: Rats receiving 5000 mg/kg PGMMEA (beta isomer) showed signs of central nervous system depression. Rats receiving 10 oral doses of 2600 mg/kg PGMMEA (beta isomer) over a 2-week period had no changes in clinical chemistry or effects seen upon detailed autopsy. (1)

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)

Effects of Long-Term (Chronic) Exposure

INHALATION:

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. 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. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: In rats, the repeated exposure to a breathable aerosol of an hydrolysate of this product did not cause any injury to the respiratory tract and did not show any sign of general toxicity. (2)

INGESTION:

PGMEA: Rats were orally exposed to 100, 300 or 1000 mg/kg/day for 44 days. At 1000 mg/kg/day, body weight was depressed and food consumption reduced, with decreases in blood glucose and inorganic phosphorus and a slight increase in relative adrenal weight. No effects were noted at the lower doses. (1)

SKIN SENSITIZATION:

MEK: Methyl ethyl ketone did not produce sensitization in the mouse ear thickness test. (1)

PGMEA: Negative results were obtained when PGMMEA was tested in guinea pigs. (1)

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)

SKIN CONTACT:

PGMEA: Repeated application of an unspecified dose of PGMMEA for 2 weeks caused slight redness and exfoliation in rabbits. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Negative results in a test of mark in human (Human patch test). (2)

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY:

MEK: Methyl ethyl ketone has caused fetotoxic effects (minor skeletal variations, delayed bone formation, reduced foetal weight) in rats and mice in the presence of mild maternal toxicity. (1)

PGMEA: Inhalation of PGMMEA (alpha isomer) did not cause developmental effects in rats, even in the presence of maternal toxicity. In rabbits exposed by inhalation, significant developmental effects were observed in the presence of minimal maternal toxicity. No teratogenic or developmental effects were observed. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: In a study of toxicity on the development during which the product was given by a stomach tube to rats during the period of organogenesis, the only effect noticed was a very slight fetotoxicity at 3000 mg/kg/day (ossification reduced on one side) in presence of maternal toxicity but no embryotoxic or teratogenic effect. No effect has been noticed at 500 and 1500 mg/kg/day. (2)

SECTION XI. TOXICOLOGICAL INFORMATION

MUTAGENICITY:

MEK: The available information does not indicate that methyl ethyl ketone is mutagenic. (1)

PGMEA: No studies using live animals were located. Negative results have been obtained in tests using cultured mammalian cells and bacteria. (1)

MDI: It is not possible to conclude that MDI is mutagenic. There are no studies available using cultured animal cells. MDI has produced mostly negative results in short-term bacteria tests. (1)

[3-(2,3-Epoxypropoxy) propyl] trimethoxysilane: Ester of organosilane shows to be slightly mutagenic in the following in vitro procedures: Ames test, test on mouse lymphoma and test of sister chromatic exchange. It is unlikely that this product presents an important genotoxic hazard, because there were no local oncogenic reaction following the repeated chronic application on mouse skin. (2)

CARCINOGENICITY:

MDI: There is no animal information on the carcinogenicity of MDI itself. The International Agency for Research on Cancer has determined there is limited evidence for the carcinogenicity of a mixture containing monomeric and polymeric MDI to experimental animals. (1)

Benzoyl Chloride: Small numbers of skin tumours have been observed following the skin application of benzoyl chloride to mice. Inhalation exposure has produced no significant increase in tumour incidence in mice. The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for the carcinogenicity of benzoyl chloride to experimental animals. (1)

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 H80 | IDENTIFICATION NUMBER: | UN 1263 |
| CLASSIFICATION (TDG - DOT): | Class 3 | SHIPPING NAME: | Paints |
| CONTAINERS FOLLOW THE STANDARDS OF: | | PACKING GROUP: | II |
| Canada: | CAN / CGSB-43.150-97 | | |
| USA: | CFR 49 parts 100 to 199 | | |

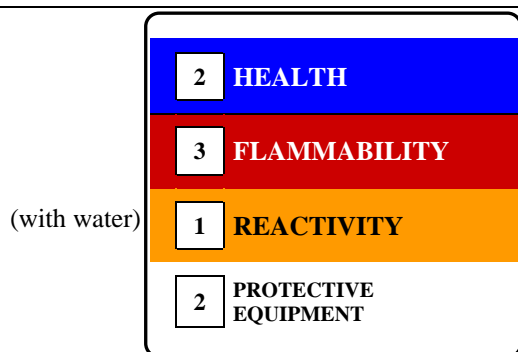
SECTION XV. REGULATORY INFORMATION

Canada - WHMIS: Class B2: Flammable liquid (flash point below 37.8°C).
 Class D1A: Very toxic material causing immediate and serious effect: (MDI: CL50)
 Class D2A: Very toxic material causing other effects. (MDI: respiratory tract sensitization)
 Class D2B: Poisonous and infectious material - Other effects – Toxic (MEK: eye irritation; MDI: skin irritation, skin sensitization)

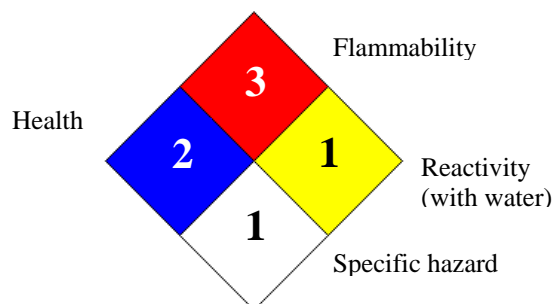
Canada - DSL: All constituents of this product are included on the Domestic Substances List (DSL – Canada).
USA - TSCA: All constituents of this product are included on the Toxic Substances Control Act Inventory (TSCA – United States).

USA – California proposition 65: Classification of benzoyl chloride: Carcinogen.

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) |
| HMSI: | Hazardous Material Information System |
| IARC: | International Agency for Research on Cancer |
| LC50: | (Lethal concentration ₅₀) Concentration of a substance in air that causes dead of 50% mortality of a defined animal population |
| LD50: | (Lethal dose ₅₀) 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 of Organisational Health and Safety, Hamilton (Ontario) Canada.
- (2) Material Safety Data Sheet of supplier

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

The Material Safety Data Sheets of SOPREMA Canada 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.