



AQUADERE

Disponible en français

WHMIS	PROTECTIVE CLOTHING	TRANSPORT OF DANGEROUS GOODS
		Not regulated

SECTION I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name: Aquadere
Use: Water-based primer used to enhance adhesion of torch-applied and self-adhesive membranes.

Code of MSDS: CA U DRU SS FS 098
Formula number: Not available
Revision date: November 1, 2006
Revised by: Marie-Claude Fontaine, Health and safety Supervisor
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In case of emergency:
 SOPREMA (8:00am to 5:00pm – Eastern time): (800) 567-1492
 CANUTECH (Canada) (24h.): (613) 996-6666
 CHEMTREC (USA) (24h.): (800) 424-9300
 Poison Control Centre: Consult local telephone directory

EMERGENCY OVERVIEW!!!

Dark brown liquid with characteristic alcohol odour. Mild central nervous system depressant following inhalation, skin absorption or ingestion. May cause headache, nausea, dizziness, drowsiness, and incoordination. Causes eye and skin irritation. Aspiration hazard. Swallowing or vomiting of the liquid may result in aspiration (breathing) into the lungs. **POSSIBLE REPRODUCTIVE HAZARD** - may cause fetotoxic and teratogenic effects, based on animal data.

SECTION II. COMPOSITION AND INFORMATION ON DANGEROUS INGREDIENTS

NAME	CAS #	% WEIGHT	EXPOSURE LIMIT (ACGIH)	
			TLV-TWA	TLV-STEL
Asphalt	8052-42-4	15-40	0.5 mg/m ³	Not established
Ethanol	64-17-5	1-5	1 000 ppm	Not established
Methanol	67-56-1	1-5	200 mg/m ³	250 mg/m ³

SECTION III. POTENTIAL HEALTH EFFECTS*Effects of Short-Term (Acute) Exposure***SKIN CONTACT:****Ethanol:**

Ethanol is either not irritating or only mildly irritating to the skin, based on human and animal information. No irritation was produced in 16 volunteers following application of 0.5 ml of 95% ethanol, using a modified Draize test. Mild irritation has been observed in animal tests. Absorption of ethanol through the skin is minimal. Harmful effects would not be expected by this route of exposure. (1)

Methanol:

Methanol may be moderately irritating to the skin, based on unconfirmed animal information. No human information was located. Methanol can be absorbed through the skin and harmful effects have been reported by this route of exposure. In most cases, inhalation exposure would have also occurred at the same time. In one case, an employee was exposed to methanol while cleaning out a tank. He was wearing a positive pressure breathing apparatus, but no protective clothing. He developed methanol toxicity with CNS and visual effects, as described in "Inhalation" below. This individual had a sunburn, which may have increased his potential for skin absorption. (1)

Asphalt:

Asphalt may be irritating to the skin. (2)

EYE CONTACT:**Ethanol:**

Depending upon concentration, direct contact with the liquid is expected to produce moderate to severe irritation, based on animal information. Exposure to high vapour concentrations can produce mild irritation. High vapour concentrations (7000-10000 ppm) have caused stinging and watering of the eyes which increased in intensity with passing time and persisted throughout the exposure. There was no subsequent eye damage noted. Exposure to 2500 ppm had no effect on the eyes. (1)

Methanol:

Methanol is a mild to moderate eye irritant, based on animal information. There is no human information available. Inhalation, ingestion or skin absorption of methanol can cause significant disturbances to vision, including blindness. Refer to "Inhalation" for additional information. (1)

Asphalt:

Asphalt may be irritating to eye. (2)

INHALATION:**Ethanol:**

Ethanol readily forms high vapour concentrations. However, harmful effects are unlikely to occur since it provides good warning of exposure. Aerosols and vapours are irritating to the nose and throat well above the odour threshold (approximately 100-180 ppm) and well below exposures expected to cause the effects typically associated with alcohol ingestion. A 30-minute exposure to 1800 to 2000 ppm ethanol aerosol caused coughing, dry throat and temporary bronchial constriction. In other studies, brief exposure to very high levels [(5300-10600 ppm (cited as 10-20 mg/L)] produced temporary irritation of the nose and coughing. At 16000 ppm (cited as 30 mg/L), continuous irritation of nose, with coughing was observed and 21300 ppm (cited as 40 mg/L) was considered to be intolerable for even a short period of time. Symptoms of alcohol intoxication which develop following the ingestion of alcoholic beverages containing ethanol have been well described in the literature (see "Ingestion"). Similar effects are not expected to occur following inhalation of ethanol, unless the victim is knocked down or unable to remove oneself from exposure to high concentrations. Individuals with repeated exposure to ethanol can develop tolerance to its effects. In this case, higher exposure may be required to produce effects which were previously observed at lower exposures. One historical study has described symptoms such as headaches and slight numbness (approximately 1380 ppm for 30 minutes); sensations of warmth/cold (from 3340 ppm for 100 minutes); difficult breathing, drowsiness and fatigue (from 8840 ppm for 60 minutes) in volunteers. The validity of this study has been questioned, since subsequent studies have shown that it is unlikely that these effects would have been observed at the low concentrations cited. (1)

Methanol:

Methanol is toxic and can very readily form extremely high vapour concentrations at room temperature. Inhalation is the most common route of occupational exposure. At first, methanol causes mild central nervous system (CNS) depression with symptoms such as nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. A time period with no obvious symptoms follows (typically 8-24 hours, but may last several hours to 2 days). This latent period is then followed by development of metabolic acidosis and severe visual effects. Symptoms such as headache, dizziness, nausea and vomiting, followed in more severe cases by abdominal and muscular pain and difficult periodic breathing have been observed. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or

SECTION III. POTENTIAL HEALTH EFFECTS

INHALATION:

Methanol: (continued)

snowy vision, and blindness. Depending on the severity of poisoning and the promptness of treatment, survivors may recover completely or may have permanent blindness, vision disturbances and/or nervous system effects. Recent reports of toxicity due to inhalation of methanol are relatively rare, possibly due to the implementation of strict control measures. There are historical reports of central nervous system effects, impairment of vision and deaths occurring following inhalation of methanol at work. Usually exposure was in a confined space with poor ventilation. Most studies do not report actual exposure concentrations. One report has described severe and recurring headaches in employees exposed to 200-300 ppm for an unspecified time. (1)

Asphalt:

Exposure is not expected by this route of entry.

INGESTION:

Ethanol:

Due to the relatively low oral toxicity of ethanol, it is unlikely that toxic effects would result from accidental occupational ingestion. Evidence from animal studies and human consumption of alcoholic beverages demonstrates that ingestion of large amounts causes depression of the central nervous system (CNS) with symptoms such as lack of coordination, impaired vision, reduced reaction time, slurred speech, impaired judgement, nausea/vomiting and unconsciousness progressing to death from respiratory or circulatory failure. For an average adult, the fatal ingested dose is approximately 1 L (approximately 2 pints) of 40-55% ethanol (the percentage found in whiskey, gin, rum, vodka, or brandy) consumed within a few minutes. Based on animal evidence and its physical properties, ethanol can be aspirated into the lungs during ingestion or vomiting. Aspiration can cause potentially fatal injury to the lungs. (1)

Methanol:

There have been case reports of accidental or intentional ingestion of methanol, usually in illegal or contaminated alcoholic beverages. Reported effects are the same as those described for "Inhalation" above. There is a wide range of individual susceptibility to the toxic effects of methanol. As little as 15 ml of 40% methanol has resulted in the death of one individual, while others have survived following ingestion of 500 ml of the same solution. In general, 300 to 1000 mg/kg is considered the range of minimum lethal dose for untreated cases of methanol poisoning. Methanol can probably be easily aspirated (breathed) into the lungs during ingestion or vomiting, based on its physical properties and comparison to related alcohols. Aspiration of methanol could cause a potentially fatal accumulation of fluid in the lungs (pulmonary oedema). Ingestion is not a typical route of occupational exposure. (1)

Asphalt:

There is no human information available. (2)

Effects of Long-Term (Chronic) Exposure

Ethanol:

Occupational exposures which principally occur by inhalation and skin contact do not result in as high absorption of ethanol as that which occurs from drinking alcoholic beverages. Ethanol vapours and mists produce irritation, thus limiting long-term inhalation exposure. Ethanol is not readily absorbed through the skin. No conclusions about the potential long-term health effects of ethanol can be drawn from a mortality study of ethanol production workers. Workers were exposed to strong sulphuric acid at the same time and it appears that this chemical is more likely to have caused the health effects observed. (1)

Methanol:

There is very little information available on the effects of long-term exposure to methanol. Despite their limitations, the available case reports and human population studies suggest that long-term, high-level exposure may cause effects similar to relatively high short-term exposures, for example central nervous system (CNS) effects and visual disorders. In one report, teaching aides worked at or near spirit duplicating machines that used a 99% methanol duplicating fluid. Exposures ranged from 1 hour/day for 1 day/week to 8 hours/day for 5 days/week over 3 years. Exposure concentrations ranged from 365-3080 ppm. Headaches, dizziness and eye irritation, blurred vision and nausea/upset stomach were more commonly reported among employees working exposed to methanol. One historical case report describes a temporary, marked reduction in vision and liver enlargement in an employee apparently exposed to extremely high concentrations (1200-8000 ppm) for an unspecified time. These effects were not observed in other employees similarly exposed. There are no further details available. (1)

Asphalt:

Exposure will most likely occur through skin or eye contact. (2)

SKIN:

Ethanol:

Long-term or repeated contact may result in dermatitis (dry, red, cracked skin). Repeated application of 10% ethanol, under cover, to 8 volunteers for 21 days produced redness and hardening of the skin during the final 7 days of exposure. Ethanol is not a clear occupational skin sensitizer. Approximately 20 cases of ethanol allergic skin reactions confirmed by positive patch tests have been identified. In most cases, exposure to ethanol was not occupational. In some cases, a previous history of allergies was also identified. One limited study suggests that contact sensitivity to ethanol may be related to an ethnic sensitivity, similar to the Oriental ethnic sensitivity to skin flushing following ingestion of alcoholic beverages. Another report suggests that some of the cases may actually be a non-allergic wheal reaction (non-allergic contact urticaria). In the three occupational exposure cases located, patch testing with ethanol proved positive. Prior history of allergies was not discussed for any of the cases. Therefore, no firm conclusions can be drawn from these reports. In one sensitization study, 6/93 volunteers developed delayed allergic skin reactions. In another study, sensitization was not produced in any of 94 subjects tested. These results indicate that ethanol may be a weak skin sensitizer. (1)

SECTION III. POTENTIAL HEALTH EFFECTS

SKIN: (continued)

Methanol:

Repeated or prolonged exposure to methanol may cause dry, itchy, scaling skin (dermatitis). It is not possible to conclude that methanol is a skin sensitizer based on the limited information available. There is one report of 4 cases of allergic skin disorders developing following contact with methanol. In one case, a laboratory technician developed sensitivity to methanol at work. She tested positive to purified methanol in a patch test. This individual had also previously tested positive in a patch test with formaldehyde. In another case, a physician developed sensitivity to ethanol (a closely related alcohol) at work. She subsequently tested positive in a patch test to purified ethanol and methanol. The report did not provide enough details to determine if either of these individuals was more likely to develop allergies (atopic). The other two cases involved non-occupational exposure. Methanol has produced negative results in one animal test for skin sensitization. (1)

Asphalt:

Repeated or prolonged contact may cause irritation. (2)

INGESTION:

Ethanol:

Long-term ingestion of alcoholic beverages containing ethanol has been clearly associated with significant health problems, including cirrhosis of the liver and diseases of the gastrointestinal, cardiovascular, respiratory, and nervous systems. Mental problems include a wide range of neurological changes, depression and other mental disorders. There are no cases or studies reported of similar long-term health effects resulting from occupational exposure to ethanol. (1)

Methanol:

There is no human information available. (1)

Asphalt:

There is no human information available. (2)

CARCINOGENICITY:

Ethanol:

Occupational exposure to ethanol has not been associated with carcinogenicity. The International Agency for Research on Cancer (IARC) has classified alcoholic beverages as carcinogenic to humans (Group 1), based on tumours of the oral cavity, pharynx, larynx, esophagus and liver. Oral exposure to alcoholic beverages containing ethanol is not relevant to occupational exposures. There is inadequate evidence to conclude that exposure to ethanol is carcinogenic to experimental animals. 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 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. NTP has listed consumption of alcoholic beverages as a known human carcinogen. (1)

Methanol:

There is no human information available. The limited animal information available suggests that methanol is not carcinogenic. The International Agency for Research on Cancer (IARC) has not evaluated the carcinogenicity of this chemical. The American Conference of Governmental Industrial Hygienists (ACGIH) has not assigned a carcinogenicity designation to this chemical. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

Asphalt:

The International Agency for Research on Cancer (IARC) considers that this product is not classifiable as to its carcinogenicity to humans. (2)

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY:

Ethanol:

There are no reports of adverse effects on pregnancy following occupational exposures. It is well documented that exposure to ethanol through the ingestion of alcoholic beverages during pregnancy can cause significant harmful effects in unborn children. Certain physical malformations, stillbirths, low birth weight, and neurological, behavioural and intelligence deficits have been observed in the children of mothers who have consumed alcohol during pregnancy. The most severe group of effects is commonly referred to as Foetal Alcohol Syndrome (FAS). The lower limit of alcohol ingestion necessary to cause FAS has not been determined, but is associated with the consumption of large amounts of alcohol or chronic alcoholism in the mother. Reduced birth weight is a less severe effect and the lower limit of alcohol ingestion associated with this effect appears to be approximately two drinks per day on average. Effects have not generally been seen with alcoholic beverage intake of about one drink per day. Animal evidence also clearly demonstrates that ingestion of ethanol can cause embryotoxicity, teratogenicity and fetotoxicity in the presence of maternal toxicity. No effects were observed in one study with very high inhalation exposures, despite the observation of significant harmful effects in the mothers. (1)

Methanol:

There is no human information available. However, methanol is considered a developmental hazard, based on animal information. In animal experiments, methanol has caused fetotoxic or teratogenic effects, in the absence of maternal toxicity. (1)

Asphalt:

There is no human information available. (2)

SECTION III. POTENTIAL HEALTH EFFECTS

REPRODUCTIVE TOXICITY:

Ethanol:

There are no reports of adverse effects on pregnancy following occupational exposures. Reproductive effects have been observed in people who have consumed large amounts of alcoholic beverages which contain ethanol. Human population studies have shown testicular atrophy and sperm effects in alcoholic men, but these effects are generally accompanied by the cirrhosis of the liver. Some studies have shown early menopause in alcoholic women. It is not possible to draw firm conclusions about the potential reproductive toxicity of ethanol from these studies because of design limitations. For example, often only a very small number of people were studied and alcoholics are commonly exposed to other harmful chemicals (for example, through smoking or second-hand smoking). Furthermore, these effects cannot be related to people who are occupationally exposed to ethanol because the nature and degree of exposure are significantly different. Effects on reproductive organs, including decreased testicular weight, decreased numbers of motile sperm, decreased ovarian function and irregular fertility cycles, have been observed in animals given very large oral doses of ethanol. However, no confirmed effects on fertility or reproductive capability have been observed. (1)

Methanol:

There is no human information available. No conclusions can be drawn based on the available animal information. (1)

Asphalt:

There is no human information available. (2)

MUTAGENICITY:

Ethanol:

Ethanol is considered a very toxic mutagen, because it has caused mutations in both the germ cells and somatic cells of live animals. These effects were observed following exposure of the animals to very high, oral doses of ethanol. There are no reports of mutagenic effects in people with occupational exposures. Mutagenic effects, such as increased frequencies of chromosomal aberrations, sister chromatid exchanges and aneuploidies have been observed in the white blood cells of alcoholics. However, it is not possible to conclusively relate these effects directly to ethanol exposure, because of other potential causes, such as smoking and exposure to other potentially harmful chemicals at the same time. (1)

Methanol:

There is no human information available. There is one positive report of mutagenicity in a study using live animals, but there are not enough details available to evaluate the study. Other studies using live animals have produced negative results. Negative results have been obtained in tests using cultured mammalian cells and bacteria. (1)

Asphalt:

There is no human information available. (2)

TOXICOLOGICALLY SYNERGISTIC MATERIALS:

Ethanol:

Most information about the interactions of ethanol with other chemicals results from studies involving alcohol consumption and exposure to chemicals. Occupational exposure to ethanol would be much lower and any interactive effects would be substantially reduced or absent. Ethanol increases liver metabolism and thus increases the metabolism of some organic compounds. It may also compete for metabolic sites thus interfering with the metabolism of other compounds. Ethanol has been associated with an increase in the toxicity of many chemicals including other alcohols, ketones (e.g. acetone and methyl ethyl ketone), benzene, toluene, halogenated hydrocarbons (e.g. carbon tetrachloride, trichloroethylene, chloroform, and methylene chloride), aromatic amines and nitrosamines. In particular, it enhances the activity of many chemicals which are harmful to the liver (hepatotoxic agents). There is also a synergistic effect between ethanol and certain metals (e.g. cobalt, manganese and mercury) or compounds containing these metals. Some chemicals (e.g. thiuram disulfides or "antabuse", dimethylformamide and cyanamide) can decrease or slow the metabolism of ethanol thereby increasing the toxic effects of ethanol. (1)

Methanol:

In animals, high concentrations of methanol can increase the toxicity of other chemicals, particularly liver toxins like carbon tetrachloride. (1)

Asphalt:

There is no human information available. (2)

POTENTIAL FOR ACCUMULATION:

Ethanol:

Ethanol does not accumulate. It is readily absorbed by the oral or inhalation routes of exposure, but skin uptake is low. Human absorption of vapours has been reported to be 33-62%, and independent of air concentration and ventilation rate. Most ethanol is metabolized before it is eliminated. It is metabolized primarily by the liver to acetaldehyde, which in turn is converted to acetic acid or acetate, which is oxidized to carbon dioxide, which is exhaled. Only small amounts are eliminated unchanged in exhaled air, urine or perspiration. The rate of metabolism varies between individuals and, in the case of animals, between species. (1)

SECTION III. POTENTIAL HEALTH EFFECTS

POTENTIAL FOR ACCUMULATION: (continued)

Methanol:

Methanol is readily absorbed into the body following inhalation and ingestion. Skin absorption may occur if the skin is broken or exposure is prolonged. Once absorbed, methanol is rapidly distributed to body tissues. A small amount is excreted unchanged in exhaled air and the urine. It is first metabolized to formaldehyde, which is then metabolized to formic acid and/or formate (which is believed to be the cause of visual damage) depending on the body's pH. The formic acid is then metabolized to carbon dioxide and water. Methanol metabolism occurs primarily in the liver. Elimination of methanol appears to be slow in all species, particularly when compared to ethanol. In humans, methanol clears from the body, after inhalation or oral exposure, with a half-life of 1 day or more for high doses (greater than 1000 mg/kg) or about 3 hours for low doses [less than 100 mg/kg or 76.5-230 ppm (100-300 mg/m³)]. (1)

Asphalt:

There is no human information available. (2)

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 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.

SWALLOWING:

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

SECTION V. FIRE FIGHTING MEASURES

FLAMMABILITY: Non flammable

FLASH POINT: Non flammable

AUTO-IGNITION TEMPERATURE: Not applicable

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

FIRE HAZARDS:

Non flammable water-based product. Concentration of alcohols is too low to create a fire hazard.

COMBUSTION PRODUCTS:

Irritating and/or toxic gases or fumes such as CO, CO₂, oxygenated compound and SOX may be generated by thermal decomposition or combustion of the product.

FIRE FIGHTING INSTRUCTIONS:

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

EXTINGUISHING MEDIA:

Foam, CO₂ powder, sand, chemical powder.

SECTION VI. ACCIDENTAL RELEASE MEASURES

RELEASE OR SPILL:

Wear appropriate protective equipment during cleanup. Shut off source of leak if you can do it without risk. Contain the spill. If the hot product is spilled, wait for it to cool off before cleanup. Absorb with inert material such as sand or earth. Shovel into containers with lids. Cover and remove to appropriate well-ventilated area until disposal. Wash spill area with soap and water. Prevent entry into waterways, sewers or basements. Dispose of this product according to local environmental regulations.

SECTION VII. HANDLING AND STORAGE

HANDLING:

This product is non flammable. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing vapours and dusts. Wash thoroughly after handling. Tightly reseal all partially used containers. Use under appropriate conditions of ventilation. Keep away from heat. 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. Do not store at temperatures lower than 5°C or over than 90°C. Keep away from children.

SECTION VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

HANDS:	Wear appropriate gloves (viton, nitrile, PVC, neoprene).
RESPIRATORY:	If the TLV is exceeded, if use is performed in a poorly ventilated confined area, use an approved respirator in accordance with standards.
EYES:	Wear chemical safety goggles in accordance with standards.
OTHERS:	Eye bath and safety shower.
CONTROL OF VAPOURS:	Local exhaust is needed to control vapour and dust level to below recommended limits.

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOUR AND APPEARANCE:	Dark brown liquid with characteristic alcohol odour
ODOUR THRESHOLD:	Not available
VAPOUR DENSITY (air = 1):	Not available
EVAPORATION RATE (Butyl acetate = 1):	Not available
BOILING POINT (760 mm Hg):	100°C
FREEZING POINT:	0°C
SPECIFIC GRAVITY (H₂O = 1):	1 kg/L
SOLUBILITY IN WATER (20°C):	Soluble
VOLATILE ORGANIC COMPOUND CONTENT (V.O.C.):	4 g/L
VISCOSITY:	101 Centipoises

SECTION X. STABILITY AND REACTIVITY

STABILITY:	This material is stable.
CONDITIONS OF REACTIVITY:	Avoid excessive freezing and heat.
INCOMPATIBILITY:	Solution or acid emulsion.
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, carbon dioxide, nitrogen and sulphur oxide.
HAZARDOUS POLYMERISATION:	None

SECTION XI. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:	
<i>Ethanol:</i>	
LC50 (mouse):	21 000 ppm (4-hour exposure) (cited as 39 g/m ³)
LD50 (oral, rat):	7 060 mg/kg
<i>Methanol:</i>	
LC50 (rat):	64 000 ppm (4-hour exposure)
LD50 (oral, rat):	5 628 mg/kg
LD50 (dermal, rabbit):	15 800 mg/kg (cited as 20 ml/kg)
<i>Effects of Short-Term (Acute) Exposure</i>	
<i>Ethanol :</i> No information.	
<i>Methanol :</i> Methanol is significantly less toxic to most experimental animals than humans, because most animal species metabolize methanol differently. Several researchers have demonstrated that monkeys have similar susceptibility to the effects of methanol compared to humans. Therefore, this review will provide information for studies using monkeys, wherever possible. Many studies have shown that methanol produces central nervous system (CNS) depression following ingestion and inhalation in several animal species. Observations have included incoordination, respiratory depression, unconsciousness, and death. Non-primate species do not ordinarily show symptoms of metabolic acidosis or the visual effects which have been observed in primates and humans. (1)	
EYE IRRITATION:	
<i>Ethanol:</i> Concentrated ethanol is a moderate to severe eye irritant. Application of 0.1 ml of undiluted ethanol caused moderate injury in rabbits (scored up to 5 where 5 is severe injury; graded 3/10). In other studies, application of 0.1 ml of 90% ethanol produced severe irritation in rabbits and 95% ethanol produced mild to moderate irritation in rabbits. There have been extensive studies of the visual and ocular effects produced with short-term and long-term ethanol intoxication. These effects are not reported here as they are not relevant to occupational exposure. (1)	

SECTION XI. TOXICOLOGICAL INFORMATION

EYE IRRITATION: (continued)

Methanol:

Methanol has produced mild to moderate eye irritation. In one study, application of 0.1 ml of undiluted methanol caused moderate injury (scored up to 5 where 5 is severe injury). In an unpublished study, application of undiluted methanol caused moderate corneal opacity in 3/6 rabbits and redness in the eyes of 6/6 rabbits. A 50 percent solution caused minimal to no effects and a 25 percent solution caused no effects. In another study, application of 100 microlitres of undiluted methanol produced mild eye irritation. (1)

SKIN IRRITATION:

Ethanol:

Concentrated ethanol is a mild skin irritant. In a modified Draize test, application of 95% ethanol produced no irritation to intact skin and only very mild irritation to abraded (damaged) skin of rabbits. Application of 0.5 ml of 95% ethanol, under cover, produced mild irritation in rabbits. In one unconfirmed study, application of 20 mg produced moderate irritation after 24 hours in rabbits in a standard Draize test. Ethanol had no effect in the mouse ear sensitization assay and failed to produce sensitization in five different tests using guinea pigs. (1)

Methanol:

There is one unconfirmed report of moderate irritation observed following a standard Draize test. In a limited study, monkeys were exposed by skin contact to methanol in a way which eliminated inhalation exposure. The lowest lethal dose was 395 mg/kg (cited as 0.5 ml/kg). (1)

INHALATION:

Ethanol:

Short-term inhalation studies showed no effects in rats exposed to 3260 ppm for 6 hours or to 10750 ppm for 0.5 hours. At higher exposures or longer exposure times, increasing signs of depression of the central nervous system (CNS) were observed. Effects included drowsiness, muscle weakness, incoordination, unconsciousness and death. Similar results were observed in other species. Exposure to 27300 ppm produced a reduced respiratory rate in 50% of the mice tested (RD50). This study was designed to evaluate the relative degree of sensory irritation (irritation of the nose, throat and respiratory tract). These results indicate that ethanol is a relatively weak sensory irritant. (1)

Methanol:

Monkeys exposed by inhalation to 500, 2000 or 5000 ppm methanol for 4 weeks showed no upper respiratory tract irritation, lung, liver, eye or optic nerve effects. The RD50, the concentration that produces a 50% decrease in the respiratory rate of mice, is 41514 ppm (10 minutes). Exposure to this concentration is expected to produce intolerable eye, nose and throat irritation (sensory irritation) in humans. (1)

INGESTION:

Ethanol:

CNS effects have also been observed in animals given oral doses of ethanol in many studies. In one study, dogs orally dosed with ethanol (3000 mg/kg in single dose or repeated for 7 days) showed changes in kidney function. In a study designed to test aspiration risk, aspiration of 0.2 ml of 100% ethanol produced death in 5/10 rats. Aspiration of 0.2 ml of 70% ethanol in water on produced death in 1/10 rats. (1)

Methanol:

Studies using monkeys exposed orally to doses of 3000 mg/kg and greater have shown that, in most cases, the animals initially developed slight CNS depression for 1-2 hours. These symptoms were followed by a period of 8-12 hours where there were no obvious signs of toxicity. Then, progressive deterioration of the animals occurred with vomiting, weakness, coma and death occurring in about 12-33 hours. Eye changes were observed in 2 monkeys orally exposed to lethal doses (3000 or 6000 mg/kg). In other studies, significant eye effects have been produced in monkeys 40-60 hours after oral exposure to 2000 mg/kg and then 500-1000 mg/kg at 12-24 hour intervals. In a study designed to provoke aspiration, aspiration of 0.2 ml methanol resulted in the death of only 1/10 rats. Methanol, like other alcohols, is expected to pose a significant risk of aspiration. In this study, the methanol boiled out of the animals mouth before it could be aspirated. (1)

Effects of Long-Term (Chronic) Exposure

INHALATION:

Ethanol:

Major effects observed following long-term inhalation or ingestion are on the liver and pancreas, with only minor other changes reported. No harmful effects were observed in rats, guinea pigs, rabbits, monkeys and dogs exposed continuously by inhalation for 90 days to 46 ppm ethanol. Guinea pigs also showed no harmful effects following intermittent inhalation exposure to 3000 ppm of a product largely composed of ethanol for 10.5 weeks. In other continuous exposure studies, where rats were exposed to high levels (8000-13300 ppm), liver changes were noted, as well as reduced numbers of cells in the spleen, thymus and bone marrow. Exposure of rabbits to saturated vapours (approximately 58000 ppm) for 25-365 days caused liver damage (cirrhosis of the liver). (1)

Methanol:

No significant effects were observed in monkeys exposed by inhalation to 13, 130 or 1300 mg/m³ for 22 hours/day for 29 months. (1)

SECTION XI. TOXICOLOGICAL INFORMATION

INGESTION:

Ethanol:

Baboons fed high dietary levels [80 ml/kg/day (equivalent to 63000 mg/kg/day)] of ethanol developed fatty livers and, in some cases, hepatitis with 9-12 months exposure. Long-term oral dosing studies using rats have shown consistent liver damage (fatty infiltration, focal necrosis, inflammation and/or fibrosis). Oral exposure of rats to 1% or 3% ethanol in semisynthetic liquid diets for two years produced damage to the nerves of the extremities (peripheral nerve degeneration) in both sexes. Liver injury, bile duct injury, inflammation of the pancreas and/or increased cell growth (hyperplasia) was observed in males. Increased cell growth in the adrenal and thyroid glands and inflammation of the clitoral gland were noted in females. Reports of effects on the immune system are inconclusive. Immune system effects were observed in one strain of rats exposed to high dietary levels (35%) of ethanol for 6 weeks, while another strain showed no significant effects. The authors conclude that susceptibility to the immune system effects may be genetically linked. (1)

Methanol:

Repeated oral exposure of monkeys to 3000-6000 mg/kg from 3-20 weeks resulted in liver cell changes. (1)

CARCINOGENICITY:

Ethanol:

The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of ethanol in experimental animals. The potential carcinogenicity of ethanol has been evaluated in numerous studies using mice, rats and hamsters. IARC has reviewed the available studies and determined that, for the most part, conclusions cannot be drawn due to deficiencies in study design. One well-conducted rat study showed no increase in carcinogenicity related to ethanol consumption. IARC has concluded that there is sufficient evidence for the carcinogenicity of acetaldehyde (the major metabolite of ethanol) in experimental animals. Some animal studies have shown that ethanol consumption enhances the carcinogenic activity of certain organ-specific carcinogens, including vinyl chloride and several N-nitrosamines. Other studies have not shown an increase in the overall incidence of tumours in animals given known carcinogens, including some N-nitrosamines. (1)

Methanol:

Limited animal information suggests that methanol is not carcinogenic. Mice, rats and monkeys were exposed by inhalation to 10-1000 ppm methanol for 20-22 hours/day for 18 and 30 months. No evidence of carcinogenicity was found in either species. In a skin carcinogenicity study, methanol was used as the solvent control. Mice were exposed to 25 microlitres of methanol twice weekly for 50 weeks. No evidence of carcinogenicity was observed. (1)

REPRODUCTIVE EFFECTS:

Ethanol:

Effects on reproductive organs, including decreased testicular weight, decreased numbers of motile sperm, decreased ovarian function and irregular fertility cycles, have been observed in animals given large oral doses of ethanol. However, no confirmed effects on fertility or reproductive capability have been observed. In a well-conducted continuous breeding study, mice were exposed to 5, 10 or 15% ethanol in water (approximately 8500, 16000 and 20000 mg/kg/day). No effects on fertility and only minor reproductive effects were observed (reduced sperm motility and increased time between litters). Male and female rats with inhalation exposure to 10000 or 16000 ppm ethanol for 6 weeks prior to mating showed no effect on fertility. In a poorly designed study, 10 male rats dosed with 20% ethanol in drinking water for 60 days showed statistically significant testicular effects and an increased rate of foetal death in all 3 post-exposure matings. Observations of reduced fertility were not statistically significant. In another poorly designed study, 10 female rabbits administered 5 ml/100 g of 10% ethanol and then mated, were determined to be infertile. No conclusions can be drawn from these studies due to the small number of animals used and the fact that only a single dosing group was used. (1)

Methanol:

No conclusions can be drawn based on the available information. No effects on reproductive performance were reported in a two-generation reproductive study. Rats were administered 10-1000 ppm by inhalation for 18-20 hours/day. Some studies suggest that inhalation of methanol may affect certain hormones (e.g. testosterone and lutenizing hormone) in male rats. The results have not been consistent or dose-related.(1)

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY:

Ethanol:

The harmful effects of ethanol administration to pregnant animals are well documented. Effects have included fetotoxicity (e.g. delayed growth), embryotoxicity (e.g. increased prenatal mortality), and teratogenicity (e.g. malformations of the central nervous system, facial structures, heart, limbs and urogenital system). The minimum dose required to produce these effects varies and determination of this dose is complicated by factors such as the duration and route of exposure and the stage of pregnancy during which the ethanol is administered. For example, long-term exposure during pregnancy produces effects at lower doses than short-term exposure. Most studies involving oral exposure to ethanol have involved very large doses which have also produced significant maternal toxicity. The lowest reported dose which caused teratogenicity in rats is approximately 316 mg/kg (cited as 0.4 ml/kg). No firm conclusions can be drawn from this study since the authors did not conduct a full evaluation of maternal toxicity. Inhalation exposure to levels as high as 20000 ppm has not produced any statistically significant teratogenic effects despite severe maternal toxicity (unconsciousness). In a related study, male and female rats were exposed to 16000 or 10000 ppm for 6 weeks before mating with untreated rats. Pregnant rats were exposed throughout pregnancy. Despite the presence of measurable neurochemical effects, there were no behavioural effects observed in the offspring of exposed male or female rats. (1)

SECTION XI. TOXICOLOGICAL INFORMATION**TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY:** *(continued)***Methanol:**

Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations that did not produce significant maternal toxicity. Mice were exposed by inhalation to 1000, 2000, 5000, 7500, 10000, or 15000 ppm methanol on days 6-15 of pregnancy. No visible signs of maternal toxicity were noted, but 1/30-40 mothers died in each group exposed to 7500 ppm and above. Embryotoxicity (post-implantation mortality) was observed at 7500 ppm and above. Teratogenicity (e.g. cleft palate, exencephaly, skeletal anomalies) was observed at 5000 ppm and above. Rats were exposed by inhalation to 0, 5000, 10000 on days 1-10 or 20000 ppm methanol on days 7-15 of pregnancy. Maternal toxicity (slightly unsteady gait) was observed at 20000 ppm only. Fetotoxicity (reduced foetal weight) was observed at 10000 and 20000 ppm. Teratogenicity was only observed at 20000 ppm. Rats were orally exposed to 2500 mg/kg/day on days 15-17 or 17-19 of pregnancy. There were no signs of maternal toxicity. Behavioural effects (impaired suckling at 24 hours and homing behaviour at 10 days) were observed in the offspring. Rats were orally exposed to 1.3, 2.6, or 5.2 ml/kg of methanol on day 10 of pregnancy. Maternal toxicity (greater than 10% weight loss) was observed at the high dose only. A dose-related increase in total anomalies (undescended testes and eye) was observed [0.6% (control group), 4.8% (1.3 ml/kg), 6.7% (2.6 ml/kg) and 17.3% (5.2 ml/kg)]. Statistical evaluation of the data was not reported. (1)

MUTAGENICITY:**Ethanol:**

Ethanol is mutagenic, based on positive results (dominant lethality, aneuploidy, sister chromatid exchanges) obtained in the germ cells and somatic cells of tests using live animals. These effects have been observed at very high doses. The mutagenicity of ethanol has been extensively studied and reviewed. Statistically significant dominant lethal mutations were observed when male mice were orally exposed to 0.1 ml of 40 or 60% ethanol (reported doses of 1240 or 1860 mg/kg/day) for 3 days and then mated. The response was dose-related with the Dominant Lethal Mutation Index 30.6 and 46.3 for the 40% ethanol and 57.4 and 67.3 for the 60% ethanol. Positive results were obtained for dominant lethal mutations in two other studies. A dose-related, statistically significant increase in aneuploidy was observed in the germ cells of male mice following a single oral dose of 0.8 ml of 12.5% or 15% ethanol (approximately 4000 or 4800 mg/kg). Positive results were also obtained for aneuploidy in the germ cells of mice and hamsters in two other studies. Male rats were exposed to 12000-16000 mg/kg (cited as 12-16 g/kg) ethanol in their diets for 6 weeks. Significantly increased numbers of micronucleated bone marrow cells were observed in the ethanol fed rats. Statistically significant sister chromatid exchanges were observed in the peripheral lymphocytes, but not the bone marrow, of rats exposed to 10 or 20% ethanol (approximately 10000 or 20000 mg/kg/day) as their only liquid supply for 3 or 6 weeks. Statistically significant sister chromatid exchanges were observed in the bone marrow of male mice when 10 or 20% ethanol (approximately 20000 or 40000 mg/kg/day) was given as the only liquid supply for 3-16 weeks. Positive and negative results have been obtained in cultured mammalian cells and bacteria. (1)

Methanol:

There is insufficient information available to conclude that methanol is mutagenic. Oral administration of 1000 mg/kg increased the incidence of chromosomal aberrations, as well as the incidence of micronuclei in red blood cells in mice. This study is reported in an abstract and there are not enough details available to draw firm conclusions. Negative results were obtained in other studies where live mice or rats were exposed orally or by inhalation. Negative results have been obtained in most tests involving cultured mammalian cells. A high concentration (7.9 mg/ml) produced positive results in mouse lymphoma cells, in the presence of metabolic activation. Negative results have been obtained in tests using bacteria, with or without metabolic activation. Inconclusive results were obtained in one strain of bacteria, in the presence of metabolic activation. (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 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: Consult local, state, provincial or territory authorities to know disposal methods.

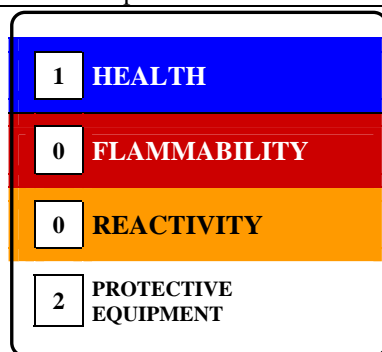
SECTION XIV. TRANSPORT INFORMATION

NAME OF PRODUCT:	Aquadere	IDENTIFICATION NUMBER:	Not regulated.
CLASSIFICATION (TDG and DOT):	Not regulated.	SHIPPING NAME:	Not regulated.
CONTAINERS FOLLOW THE STANDARDS OF:		PACKING GROUP:	Not regulated.
Canada:	CAN / CGSB-43.150-97		
USA:	CFR 49 parts 100 to 199		

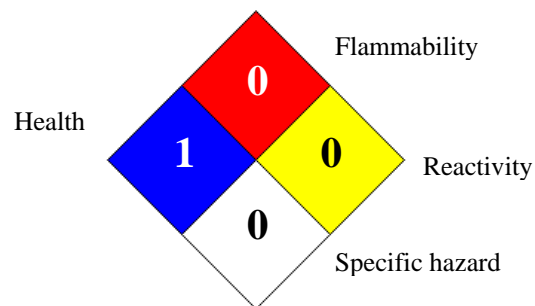
SECTION XV. REGULATORY INFORMATION

WHMIS: Class D2A: Other toxicological effects: Mutagenicity (Ethanol); Teratogenicity and Embryotoxicity (Methanol).
 Class D2B: Other toxicological effects: Eye and skin irritation (Ethanol and Methanol).
DSL: All constituents of this product are included in the Domestic Substances List (DSL – Canada)
TSCA: All constituents of this product are included in the Toxic Substances Control Act Inventory (TSCA – USA).

HMIS (USA):



NFPA (USA):



SECTION XVI. OTHER INFORMATION

Glossary:

ACGIH: American Conference of Governmental Industrial Hygienists
ANSI: American National Standards Institute
CAS: Chemical Abstract Services
CFR: Code of Federal Regulations (United States)
CSA: Canadian Standardisation Association
DOT: Department of Transportation
DSL: Domestic Substances List (Canada)
EPA: Environmental Protection Agency (United States)
HMIS: Hazardous Material Information System
IARC: International Agency of Research on Cancer
ICBR: Industrial and Commercial Buildings Regulations
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
NIOSH: National Institute for Occupational Safety and Health (United States)
N.S.A.: Not Specified Otherwise
NTP: National Toxicology Program (United States)
OSHA: Occupational Safety & Health Administration (United States)
RCRA: Resource Conservation and Recovery Act (United States)
RTECS: Registry of Toxic Effects of Chemical Substances
TDG: Transportation of Dangerous Goods (Canada)
TLV-TWA: Threshold Limit Value – Time-weighted Average
TSCA: Toxic Substances Control Act
WHMIS: Workplace Hazardous Materials Information System (Canada)

References:

- (1) CHEMINFO (2003) Canadian Centre of Organisational Health and Safety, Hamilton (Ontario) Canada
- (2) Material Safety Data Sheet of the supplier

This MSDS has been prepared by: Marie-Claude Fontaine
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:

- New product.

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

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier or any of its subsidiaries assumes any liability whatsoever for the accuracy of completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.