Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
AMERSTAT® HD

STATEMENT OF HAZARDOUS NATURE

NFPA

SUPPLIER
Company: Drew Marine- USA
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PRODUCT USE
Used according to manufacturer’s directions.

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK
Causes severe burns.
Risk of serious damage to eyes.
May cause SENSITISATION by skin contact.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
Accidental ingestion of the material may be damaging to the health of the individual.
The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.

EYE
If applied to the eyes, this material causes severe eye damage.
The material can produce severe chemical burns to the eye following direct contact.

continued...
Vapors or mists may be extremely irritating.

SKIN
The material can produce severe chemical burns following direct contact with the skin.
Open cuts, abraded or irritated skin should not be exposed to this material.
Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
This material can cause inflammation of the skin on contact in some persons.

INHALED
The material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
Not normally a hazard due to non-volatile nature of product.

CHRONIC HEALTH EFFECTS
Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.
Prolonged or repeated minor exposure to ammonium gas/vapour may cause long-term irritation to the eyes, nose and upper respiratory tract. Repeated exposure or prolonged contact may produce dermatitis, and conjunctivitis. Other effects may include ulcerative changes to the mouth and bronchial and gastrointestinal disturbances. Adaptation to usually irritating concentrations may result in tolerance. In animals, repeated exposures to sub-lethal levels produces adverse effects on the respiratory tract, liver, kidneys and spleen. Exposure at 675 ppm for several weeks produced eye irritation in dogs and rabbits; corneal opacity, covering between a quarter to one half of the total surface area, was evident in rabbits.
Long-term exposure to carbon disulfide (CS2) may cause serious damage to the central nervous system (degeneration of the peripheral nerves), vision problems, liver and kidney damage, anaemia, fatigue and debility. Other symptoms of chronic exposure include insomnia, nightmares, defective memory and impotency. Coronary heart disease has also been significantly linked to CS2 exposure.
A daily four hour exposure at concentrations exceeding 150 ppm produces chronic intoxication after a few months; 100-150 ppm is thought to produce chronic poisoning after a year or more whilst 50-100 ppm produces sporadic cases of mild intoxication. Exposure to 144-321 ppm (445-1000 mg/m3) for 5 years or longer resulted in polyneuritis in 88 of 100 workers. Encephalopathy was observed in 43 cases. Also seen were tremors, vertigo, psychosis, and myopathy. Polyneuritis has been reported following exposure to 5 ppm (15.6 mg/m3), and reductions in nerve fiber conduction velocity have been reported after exposure to 1.0-7.6 ppm for an average of about 12 years.
Persons with pre-existing central nervous system, gastrointestinal tract, liver, kidneys, skin and blood disorders are potentially more susceptible to symptoms of exposure and should be excluded from all forms of exposure. The toxic effects of carbon disulfide, particularly on the nervous system, can be intensified by consumption of alcohol or simultaneous exposure to hydrogen sulfide.
Concentrations as low as 20 ppm may produce neurological damage - women appear to be more susceptible to the neurological effects of carbon disulfide. These effects include headache, apprehension, lethargy, sleepiness, hearing and position sense loss, paraesthesias, muscle pain, tremors, ataxia, staggering gait, weakness, loss of lower extremity reflexes, and paralysis. Visual disturbances include decreased visual acuity, impaired recognition of red and green, nystagmus, diplopia, disturbed pupillary reaction to light - optic nerve atrophy may also occur. A decrease in corneal reflex may be an indication of chronic intoxication. Psychiatric symptoms may include loss of memory, nightmares leading to loss of sleep, mental deterioration, acoustic and visual hallucinations, rapid mood changes ranging from irritability to manic-depressive psychoses, and suicidal tendencies. Disturbances to the libido and impotence (with effects on sperm) have also been recorded. Menstrual and ovarian function disorders and an increased risk of spontaneous abortion may also occur.
Liver damage may be indicated by a palpable, tender liver and minor derangement of liver function. Chronic renal dysfunction may occur at concentrations not sufficiently great to produce neurological damage. Gastric or duodenal ulcers may also be produced as a result of chronic exposure.
Coronary heart disease has been significantly linked to carbon disulfide. A series of studies in Finland showed a significant excess mortality from cardiovascular disease in workers exposed to carbon disulfide for at least 5 years to concentrations estimated to range from 20-40 ppm in the 1950's and 10-30 ppm in the 1960's. Most workers, however, had been exposed repeatedly to far higher concentrations at various times.
Nutritional factors may account for variations in response shown amongst workers. Experimental rabbit diets reinforced with a high mineral mixture, especially copper and zinc, permitted daily exposures at 1100 ppm CS2 without the observed effects seen in the controls (body weight loss, serum lipoprotein and total cholesterol increase, adrenal hypertrophy and pathological changes to the brain and spinal cord).
Epidemiology studies revealed no definitive increased risk for cancer among workers who were exposed to carbon disulfide for up to 15 years. Other studies reported no association between occupational exposure to carbon disulfide and cancer mortality. In some cases mortality due to cancer was less in the carbon disulfide population than in the control group.
Prolonged inhalation exposure to low levels of carbon disulfide can cause adverse reproductive system effects in humans. An increased incidence of fetal resorptions has been reported in rabbits exposed to carbon disulfide. Inhalation exposure does not appear to damage the developing offspring of laboratory animals.
A number of epidemiological studies have reported that inhalation exposure to 13-77 ppm carbon disulfide resulted in changes in sperm morphology, decreased hormone levels, and decreased libido in males; and menstrual irregularities in females. One report
indicated increased menstrual disorders and greater incidence of toxaemia in pregnancy after occupational exposure to about 12.18 ppm carbon disulfide. An increase in spontaneous abortions was reported in one study following occupational exposure to about 9 ppm. There are no data that indicate an increase in congenital malformations in children born to mothers exposed by any route to carbon disulfide.

Foetal resorption was reported in rabbits exposed orally to 25 mg/kg/day during gestation, but was not seen in rats exposed to 100 mg/kg/day. The 25 mg/kg/day dose was a frank-effect-level (FEL) for fetal resorption in rabbits. Inhalation experiments failed to show any effects on foetal development in rats or rabbits exposed to 62.3 or 124.6 mg/m3 (5 and 10 mg/kg/day, rats; 11, 22 mg/kg/day, rabbits) given from 34 weeks before breeding through the entire gestation period. The highest no-observed-adverse effect level (NOAEL) for the study was 22 mg/kg/day; however, this NOAEL was close to the FEL seen in the previous experiment.

### Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>dazomet</td>
<td>533-74-4</td>
<td>20-25</td>
</tr>
<tr>
<td>sodium hydroxide</td>
<td>1310-73-2</td>
<td>&lt;4</td>
</tr>
</tbody>
</table>

### Section 4 - FIRST AID MEASURES

**SWALLOWED**
- For advice, contact a Poisons Information Center or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

**EYE**
- If this product comes in contact with the eyes:
  - Immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.

**SKIN**
- If skin or hair contact occurs:
  - Immediately flush body and clothes with large amounts of water, using safety shower if available.
  - Quickly remove all contaminated clothing, including footwear.
  - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
  - Transport to hospital, or doctor.

**INHALED**
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g. lung edema, fluid in the lungs).

**NOTES TO PHYSICIAN**
- Treat symptomatically.
  - For acute or short-term repeated exposures to highly alkaline materials:
    - Respiratory stress is uncommon but present occasionally because of soft tissue edema.
    - Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
    - Oxygen is given as indicated.
    - The presence of shock suggests perfusion and mandates an intravenous line and fluid administration.
    - Carbon disulfide intoxication results in severe debilitating CNS symptoms (irritability, mania, hallucinations, tremors, memory loss).
    - Chronic industrial exposures may cause neuropsychiatric changes, peripheral neuropathies and accelerated atherogenic changes.
    - Peak blood concentrations appear 2 hours after inhalation. Plasma elimination half-life is about 1 hour. Metabolic products seen in urine include thiourea, 2-mercapto-2-thiazolin-5-one and 2-thiazolidine-4-carboxylic acid (TTCA). The iodine-azide test identifies these.
    - Initial management of severe inhalation poisoning requires careful attention to airway, breathing and circulation. Treatment involves symptomatic care.
  - For acute or short-term repeated exposures to ammonia and its solutions:
    - Mild to moderate inhalation exposures produce headache, cough, bronchospasm, nausea, vomiting, pharyngeal and retrosternal

**continued...**
pain and conjunctivitis. Severe inhalation produces laryngospasm, signs of upper airway obstruction (stridor, hoarseness, difficulty in speaking) and, in excessively, high doses, pulmonary edema.
- Warm humidified air may soothe bronchial irritation.
- Test all patients with conjunctival irritation for corneal abrasion (fluoroscein stain, slit lamp exam)
- Dyspneic patients should receive a chest X-ray and arterial blood gases to detect pulmonary edema.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHg): Not Available
Upper Explosive Limit (%): Not Available
Specific Gravity (water=1): 1.16 @25C
Lower Explosive Limit (%): Not Available

EXTINGUISHING MEDIA
- The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas. Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances. In such an event consider:
  - foam.
  - dry chemical powder.
  - carbon dioxide.

FIRE FIGHTING
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area. When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
Combustion products include: carbon dioxide (CO2), nitrogen oxides (NOx), sulfur oxides (SOx), other pyrolysis products typical of burning organic material. May emit corrosive fumes.

FIRE INCOMPATIBILITY
None known.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.

MAJOR SPILLS
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.

**RECOMMENDED STORAGE METHODS**

- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.

For low viscosity materials:
- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

**STORAGE REQUIREMENTS**

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- DO NOT store near acids, or oxidizing agents.
- No smoking, naked lights, heat or ignition sources.

### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### EXPOSURE CONTROLS

<table>
<thead>
<tr>
<th>Source</th>
<th>Material</th>
<th>Peak mg/m³</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>US ACGIH Threshold Limit Values (TLV)</td>
<td>sodium hydroxide (Sodium hydroxide)</td>
<td>2</td>
<td>TLV® Basis: URT, eye, &amp; skin irr</td>
</tr>
</tbody>
</table>

The following materials had no OELs on our records:
- dazomet: CAS:533- 74- 4

#### MATERIAL DATA

**AMERSTAT® HD:**
- Not available

**DAZOMET:** for exposure to ammonia gas/ vapours:
- Odour Threshold Value: Various reported as 0.019 ppm and 55 ppm; AIHA Value 16.7 ppm (detection)
- NOTE: Detector tubes for ammonia, measuring in excess of 1 ppm, are commercially available.

The TLV-TWA is thought to be protective against irritation of the eyes and respiratory tract and minimise discomfort among workers that are not inured to its effects and systemic damage. Acclimatised persons are able to tolerate prolonged exposures of up to 100 ppm without symptoms. Marked irritation has been seen in persons exposed to ammonia concentrations between 50 and 100 ppm only when the exposures involved sudden concentration peaks which do not permit short-term acclimatisation. The detoxification capacity of the liver is significant since the amount of ammonia formed endogenously in the intestines markedly exceeds that from external sources.

Human exposure effects, at vapour concentrations of about:

<table>
<thead>
<tr>
<th>Concentration (ppm)</th>
<th>Possible Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>minimal irritation</td>
</tr>
<tr>
<td>9-50</td>
<td>nasal dryness, olfactory fatigue and moderate irritation</td>
</tr>
<tr>
<td>125-137</td>
<td>definite nose, throat and chest irritation</td>
</tr>
<tr>
<td>140</td>
<td>slight eye irritation</td>
</tr>
<tr>
<td>150</td>
<td>laryngeal spasm</td>
</tr>
<tr>
<td>500</td>
<td>30 minute exposures may produce cyclic hyperpnea, increased blood pressure and pulse rate, and upper respiratory tract irritation which may persist for 24 hours</td>
</tr>
<tr>
<td>700</td>
<td>immediate eye irritation</td>
</tr>
<tr>
<td>1, 500-10, 000</td>
<td>dyspnea, convulsive coughing, chest pain, respiratory spasm, pink frothy sputum, rapid asphyxia and delayed pulmonary oedema which may be fatal. Other effects include runny nose, swelling of the lips, restlessness, headache, salivation, nausea, vomiting, glottal oedema, pharyngitis, tracheitis, and speech difficulties. Bronchopneumonia, asphyxiation due to spasms, inflammation, and oedema of the larynx, may be fatal. Residual effects include hoarseness, productive cough, and decreased respiratory function</td>
</tr>
</tbody>
</table>

continued...
>2, 500 severe eye irritation, with swelling of the eyelids, lachrymation, blepharospasm, palpebral oedema, increased intraocular pressure, oval semi-dilated, fixed pupils, corneal ulceration (often severe) and temporary blindness. Depending on duration of exposure, there may be destruction of the epithelium, corneal and lenticular opacification, and iritis accompanied by hypopyon or haemorrhage and possible loss of pigment from the posterior layer of the iris. Less severe damage is often resolved. In the case of severe damage, symptoms may be delayed; late complications including persistent oedema, vascularisation and corneal scarring, permanent opacity, acute angle glaucoma, staphyloma, cataract, and atrophy of the retina, iris, and symblepharon. Long-term exposure to sub-acute concentrations or single exposures to high concentrations may produce chronic airway dysfunction, alveolar disease, bronchiolitis, bronchiectasis, emphysema and anxiety neuroses

Odour Safety Factor(OSF)
OSF=3.8 (AMMONIA),
for formaldehyde:
Odour Threshold Value for formaldehyde: 0.98 ppm (recognition)
NOTE: Detector tubes for formaldehyde, measuring in excess of 0.2 ppm are available commercially.
Formaldehyde vapour exposure:
Primary irritation is dependent on duration of exposure and individual susceptibility.
The following are typical symptoms encountered at various exposure levels.
0.1 ppm - Lower level of mucous eye, nose and throat irritation
0.8 ppm - Typical threshold of perception
1-2 ppm - Typical threshold of irritation
2-3 ppm - Irritation of eyes, nose and throat
4.5 ppm - Increased irritation, tearing, headache, pungent odour
10-20 ppm - Profuse tearing, severe burning, coughing
50 ppm - Serious bronchial and alveolar damage
100 ppm - Formaldehyde induced chemical pneumonia and death

Despite the intent of the TLV Ceiling recommendation it is believed that 0.3 ppm will not protect that portion of the workforce (up to 20%) reported to be responsive to low ambient concentrations. Because of the dose-related carcinogenic activity for rat and mouse inhalation of formaldehyde, the report of macromolecular adducts in the upper and lower respiratory tracts of nonhuman primates following inhalation of formaldehyde, the human case reports of upper respiratory tract malignant melanoma associated with formaldehyde inhalation and the suggestive epidemiologic data on human cancer risk, the TLV Committee recommends that workplace formaldehyde air concentrations be reduced to the lowest possible levels that can be achieved using engineering controls.

Odour Safety Factor(OSF)
OSF=0.36 (FORMALDEHYDE).
for carbon disulfide:
Odour Threshold Value: 0.026-0.16 ppm
Based on industrial experience;
160-230 ppm : generally produces no acute symptoms in man
320-390 ppm : exposure may be bearable for several hours with headaches and unpleasant feeling resulting after 8 hours.
1150 ppm : produces giddiness
2000-3200 ppm: may produce light intoxication, paraesthesias and irregular breathing within 30-60 minutes.
4800 ppm : may be lethal
NOTE: Detector tubes for carbon disulfide, measuring in excess of 3 ppm, are commercially available. Long-term measurements (8 hrs) may be conducted to detect concentrations exceeding 1.3 ppm.

Exposure at or below the TLV-TWA is thought to protect the worker against cardiovascular, reproductive and central nervous system effects. Differences between the limits set by various agencies seem to reflect the response to carbon disulfide amongst workers in different countries (more adverse health effects are reported in European workers than in U.S. workers under equivalent exposures). This difference may lie within worker population demographics, specific work practices, differences in the amount of carbon disulfide absorbed through the skin, interactions with other substances, nutritional status, genetic predisposition or differences in the sampling and analyses of workplace environments.

Odour Safety Factor(OSF)
OSF=45 (carbon disulfide).

SODIUM HYDROXIDE:

for sodium hydroxide:
The TLV-C is recommended based on concentrations that produce noticeable but not excessive, ocular and upper respiratory tract irritation.

PERSONAL PROTECTION

RESPIRATOR

• Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

continued...
Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE
- Chemical goggles.
- Full face shield.
- Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET
- Elbow length PVC gloves.
  - When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
  - dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER
- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

ENGINEERING CONTROLS
Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES
Mixes with water.
Corrosive.
Alkaline.

State: LIQUID
Melting Range (°F): Not Available
Boiling Range (°F): 212
Flash Point (°F): >201
Decomposition Temp (°F): Not Available
Autoignition Temp (°F): Not Available
Upper Explosive Limit (%): Not Available
Lower Explosive Limit (%): Not Available
Volatile Component (%vol): Not Available

Molecular Weight: Not Applicable
Viscosity: 8.35 cSt@24°C
Solubility in water (g/L): Miscible
pH (1% solution): Not Available
pH (as supplied): 13.6
Vapour Pressure (mmHg): Not Available
Specific Gravity (water=1): 1.16 @25°C
Relative Vapor Density (air=1): Not Available
Evaporation Rate: <1 BuAC = 1

APPEARANCE
Pale yellow liquid with pungent odour; mixes with water.

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY
- Presence of incompatible materials.
- Product is considered stable.

continued...
Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

STORAGE INCOMPATIBILITY

- Hazardous polymerization will not occur.

Carbon disulfide:
- may decompose explosively when subject to shock, friction or concussion
- may ignite spontaneously on contact with air, or with hot surfaces releasing toxic and flammable hydrogen sulfide gas
- vapours may be ignited by contact with an ordinary light bulb, a warm steam pipe or a hot exhaust pipe
- the vapour or liquid may ignite in contact with hot steam pipes, particularly if rusted
- may release hydrogen sulfide on contact with acids or acid fumes
- contact with metal oxides may lower ignition point
- reacts with zinc in incandescence
- is incompatible with chemically active metals (sodium, potassium, aluminium, magnesium)
- ignites or reacts violently with alkali metals, strong oxidisers, reducing agents, including hydrides, nitrides and sulfides, alkali metals, nitrogen oxide
- vapour may cause ignition or explosion of finely divided aluminium, dichlorine oxide, fluorine, chlorine, phosphorus oxychloride
- mixtures with potassium-sodium alloy, potassium, sodium or lithium are capable of detonation by shock (the explosive power decreases in that order), though not by heating
- explosively reacts with azides, active metals, metal oxides, metal azides, amines, imines, halogens, nitrogen oxides, permanganates and sulfuric acid.
- aqueous solutions with metal azides produce metal azodithioformates, most of which are explosive with varying degrees of power and sensitivity to shock or heat
- forms impact-sensitive explosive with potassium azide
- is incompatible with aliphatic amines, alkanolamines, carbon monoxide, chlorine monoxide, ethylene, diamine, ethyleneimine, halogens, organic amines
- attacks some forms of plastic, rubber and coatings
- flow or agitation may generate electrostatic charges.

Formaldehyde:
- is a strong reducing agent
- may polymerise in air unless properly inhibited (usually with methanol up to 15%) and stored at controlled temperatures
- will polymerize with active organic material such as phenol
- reacts violently with strong oxidisers, hydrogen peroxide, potassium permanganate, acrylonitrile, caustics (sodium hydroxide, yielding formic acid and flammable hydrogen), magnesium carbonate, nitromethane, nitrogen oxides (especially at elevated temperatures), peroxoformic acid
- is incompatible with strong acids (hydrochloric acid forms carcinogenic bis(chloromethyl)ether*), amines, ammonia, aniline, bisulfides, gelatin, iodine, magnesite, phenol, some monomers, tannins, salts of copper, iron, silver.
- acid catalysis can produce impurities: methylal, methyl formate

Aqueous solutions of formaldehyde:
- slowly oxidise in air to produce formic acid
- attack carbon steel

Concentrated solutions containing formaldehyde are:
- unstable, both oxidising slowly to form formic acid and polymerising; in dilute aqueous solutions formaldehyde appears as monomeric hydrate (methylene glycol) - the more concentrated the solution the more polyoxymethylene glycol occurs as oligomers and polymers (methanol and amine-containing compounds inhibit polymer formation)
- readily subject to polymerisation, at room temperature, in the presence of air and moisture, to form paraformaldehyde (8-100 units of formaldehyde), a solid mixture of linear polyoxymethylene glycols containing 90-99% formaldehyde; a cyclic trimer, trioxane (CH2O3), may also form

Flammable and/or toxic gases are generated by the combination of aldehydes with azo, diazo compounds, dithiocarbamates, nitrides, and strong reducing agents

*The empirical equation may be used to determine the concentration of bis(chloromethyl)ether (BCME) formed by reaction with HCl:

log(BCME)ppb = -2.25 + 0.67 log(HCHO) ppm + 0.77 log(HCl)ppm

Assume values for formaldehyde, in air, of 1 ppm and for HCl of 5 ppm, resulting BCME concentration, in air, would be 0.02 ppb.

Methyl isothiocyanate:
- is incompatible with strong acids, strong bases, caustics, chlorates (e.g. potassium chlorate, sodium chlorate), ammonia, amines, amides. alcohols, glycols, caprolactam solution, nitric acid, nitrates, organic peroxides, peroxides, strong oxidisers
- is corrosive to zinc, copper, aluminium, and their alloys, iron and other metals - rapidly forms black precipitate on contact with ordinary steel.
- Segregate from alcohol, water.
- Avoid strong acids.
- Avoid contact with copper, aluminium and their alloys.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

AMERSTAT® HD
TOXICITY AND IRRITATION
- Not available. Refer to individual constituents.

SKIN
sodium hydroxide  US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)  Skin  X
sodium hydroxide  US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin  Skin  X
sodium hydroxide  GESAMP/EHS Composite List - GESAMP Hazard Profiles  D1: skin irritation/corrosion (3)
sodium hydroxide  GESAMP/EHS Composite List - GESAMP Hazard Profiles  D1: skin irritation/corrosion  3C

Section 12 - ECOLOGICAL INFORMATION
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/ safety data sheets.

Ecotoxicity
<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence:</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water/Soil</td>
<td>No Data Available</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>dazomet</td>
<td>HIGH</td>
<td>No Data Available</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
<tr>
<td>sodium hydroxide</td>
<td>LOW</td>
<td>No Data Available</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

Section 13 - DISPOSAL CONSIDERATIONS
US EPA Waste Number & Descriptions
A. General Product Information
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
- Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
- A Hierarchy of Controls seems to be common - the user should investigate:
  - Reduction
  - Reuse
  - Recycling
  - Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
- DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
  - Recycle wherever possible.
  - Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
  - Treat and neutralize at an approved treatment plant.
  - Treatment should involve: Neutralization with suitable dilute acid followed by: Burial in a licensed land-fill or Incineration in a licensed apparatus (after admixture with suitable combustible material).
Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: G
Identification Numbers: UN3266
Label Codes: 8
Packaging: Exceptions: 154
Packaging: Exceptions: 154
Quantity Limitations: 30 L
Cargo aircraft only:
Name: Corrosive liquid, basic, inorganic, n.o.s.

Air Transport IATA:
ICAO/IATA Class: 8
UN/ID Number: 3266
Special provisions: A3A803

IMDG Class: 8
UN Number: 3266
EMS Number: F- A, S- B
Limited Quantities: 1 L
Shipping name: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (contains sodium hydroxide)

Maritime Transport IMDG:
ICAO/IATA Subrisk: None
Packing Group: II
Special provisions: 274
Marine Pollutant: Yes

Section 15 - REGULATORY INFORMATION

REGULATIONS

US EPCRA Section 313 Chemical List
Ingredient | CAS | % de minimus concentration
dazomet | 533-74-4 | 1.0

US CERCLA List of Hazardous Substances and Reportable Quantities
Ingredient | CAS | RQ
sodium hydroxide | 1310-73-2 |

Regulations for ingredients
dazomet (CAS: 533-74-4) is found on the following regulatory lists;
sodium hydroxide (CAS: 1310-73-2, 12200-64-5) is found on the following regulatory lists:


No data for AMERSTAT® HD (CW: 4771-30)

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>CAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>sodium hydroxide</td>
<td>1310-73-2, 12200-64-5</td>
</tr>
</tbody>
</table>

Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

For detailed advice on Personal Protective Equipment, refer to the following U.S. Regulations and Standards:

OSHA Standards - 29 CFR:
1910.132 - Personal Protective Equipment - General requirements
1910.133 - Eye and face protection
1910.134 - Respiratory Protection
1910.136 - Occupational foot protection
1910.138 - Hand Protection
Eye and face protection - ANSI Z87.1
Foot protection - ANSI Z47.1

Respirators must be NIOSH approved.

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