MATERIAL SAFETY DATA SHEET

AMMONIUM HYDROXIDE

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: Ammonium hydroxide. Ammonia water. Ammonium hydrate.
Chemical Family: Inorganic nitrogen compound
Chemical Formula: NH_4OH
Product Use: Laboratory reagent
Manufacturers Name and Address: Caledon Laboratories Ltd. 40 Armstrong Avenue Georgetown, Ontario L7G 4R9
Telephone No: (905) 877-0101
Fax No: (905) 877-6666
Emergency Telephone No: CANUTEC (613) 996-6666

HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients, %, TLV Units, CAS No: Ammonium hydroxide, up to 30.0, 25 ppm, 1336-21-6

PHYSICAL DATA

Physical State: Liquid
Odour and Appearance: Colourless to milky coloured liquid. Intense, pungent odour of ammonia
Odour Threshold (ppm): Reports vary widely 0.043 ppm - 53 ppm (detection); not reliable warning properties; vary too widely.
Vapour Pressure (mm Hg): ~ 112.5 mm Hg at 20 °C (10 %)
Vapour Density (Air = 1): 0.6
Evaporation Rate: Not available.
Boiling Point (degrees C): 27.2 °C
Freezing Point (degrees C): -77 °C
pH: 11.6 (1 N)
Specific Gravity: 0.895 at 15 °C (30 %)
Coefficient of Water/Oil distribution: No data

SHIPPING DESCRIPTION

UN: 2672
T.D.G. Class: 8
Pkg. Group: III

REACTIVITY DATA

Chemical Stability: Stable.
Incompatibility with other substances: May react violently or explosively with strong oxidizing agents, acids, acid chlorides, acid anhydrides, chloroformates, dimethyl sulphate, galvanized iron. Reacts violently, or forms explosive products, with all four halogens, with many interhalogens, and with calcium, hypochlorite bleaches, gold, mercury, or silver. Corrosive to alluminum, lead, zinc, copper, silver, nickel, tin and their alloys. May form shock-sensitive compounds that may explode when dry, with heavy metals and their salts, especially halide salts. Increases the sensitivity of nitromethane to detonation, and may formexplosive salts. Reacts with calcium, evolving heat; may ignite at higher temperatures. Mixture with acrolein, propiolactone, or propylene oxide, cause temperature and pressure to rise.
Reactivity: Contact with strong oxidizers may cause fire or explosion. Avoid excessive heat, ignition sources, and all incompatible materials. Avoid generating dust or vapours.

FIRE AND EXPLOSION DATA

Flammability: Liquid is non flammable. Gas is considered non-flammable, but an intense energy source can cause ignition and/or explosion. Mixtures of ammonia and air have exploded in confined spaces. Vapors can travel to a source of ignition and flash back.
Extinguishing Media: CO_2, dry chemical, foam, water spray. Fight fire from a safe distance and from upwind. Do not extinguish burning gas if flow cannot be shut off immediately. Use water as spray or fog to absorb heat, cool containers, and disperse vapours. Containers may explode in a fire. Move containers from fire area if it can be done without risk. Firefighters must wear full-body encapsulating chemical resistant suit and full face-piece, positive-pressure self-contained breathing apparatus.
Flash Point (Method Used): Not available.
Autoignition Temperature: 651 °C (ammonia)
Upper Flammable Limit (% by volume): 25 % (ammonia)
Lower Flammable Limit (% by volume): 15.5 % (ammonia)
Hazardous Combustion Products: Ammonia, irritating and toxic gases, acrid smoke.
Sensitivity to Impact: Ammonia reacts with some heavy metals (mercury, silver, gold) and their salts to produce shock-sensitive materials
Sensitivity to Static discharge: Liquid is not sensitive, but may release gas, which, under certain conditions, may be ignited by static discharge.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:
LD50: (oral, rat) 350 mg/kg
LDLO: (oral, human) 43 mg/kg
LC50: (mouse) 2,115 ppm/4h
LCLO: (human) 30,000 ppm
Effects of Acute Exposure to Product: Existing skin disorders and respiratory disease may be aggravated by exposure to this product.
Inhaled: Corrosive. Mists or vapours are destructive to tissue of upper respiratory tract. Can cause coughing, chest pain, breathing difficulty, pulmonary edema. Exposure to 20 ppm - 25 ppm of ammonia gas causes discomfort. Exposure to 130 ppm for 5 minutes causes irritation. Brief exposure to 5,000 ppm can cause death due to suffocation or pulmonary edema. Onset of pulmonary edema may be delayed; if victim feels unwell during the next 48 hours, get medical attention immediately. If exposure is not fatal, it can cause permanent damage to lung tissue.
In contact with skin: Contact with liquid causes severe burns, with ulceration and permanent scarring. High vapour concentrations may cause irritation. Extent of damage depends on concentration and duration of exposure.
In contact with eyes: Liquid and vapours are corrosive. Damage can range from severe irritation and mild scarring to blistering, ulceration, corneal burns, severe scarring and clouding of the cornea, temporary or permanent blindness. Extent of damage depends on concentration and duration of exposure.

Ingested: Not a normal route of exposure. Where ingestion of strong alkalies has occurred in humans, symptoms included severe pain, vomiting, diarrhea, and collapse. If death does not occur in the first 24 hours, the patient may improve for 2-4 days and then have a sudden onset of severe abdominal pain, and rapid fall of blood pressure, indicating delayed gastric or esophageal perforation. Damage to the esophagus and stomach after ingestion may progress for 2-3 weeks. Death from peritonitis may occur as late as 1 month after ingestion. Even though the patient recovers from the immediate damage, esophageal stricture may occur weeks, months or even years later to make swallowing difficult. Aspiration may occur during ingestion or vomiting, and can cause serious lung damage, pulmonary edema, and death.
Effects of Chronic Exposure to Product: Prolonged contact may cause dermatitis.
Carcinogenicity: Not considered carcinogenic.
Teratogenicity: No human or animal information available.
Reproductive Effects: No human or animal information available.
Mutagenicity: No human information available. Animal and bacterial studies inconclusive.
Synergistic Products: None known.

PREVENTIVE MEASURES

Engineering Controls: Local corrosion-proof exhaust ventilation required.
Respiratory Protection: Up to 250 ppm (ammonia) - NIOSH/MSHA approved cartridge respirator with cartridge to protect against ammonia. Up to 300 ppm (ammonia) - powered air-purifying respirator with cartridge to protect against ammonia or full face-piece supplied-air respirator. For emergency or unknown concentrations, positive pressure, full-facepiece self-contained breathing apparatus.
Eye Protection: Chemical safety goggles, face shield.
Skin Protection: Butyl rubber gloves. For shorter exposures(<4 hours), or for concentrations <30 % , neoprene, nitrile rubber, Saranex, Viton, or Teflon are adequate. Impermeable overalls, apron and other protective clothing sufficient to prevent contact if splash occurs.
Other Personal Protective Equipment: Safety shower and eye wash fountain readily available in work area.
Leak and Spill Procedure: Remove any sources of ignition. Evacuate and ventilate area. Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent any contact or inhalation. Stop and contain leak or spill. Dike with inert material and collect for reclaim or disposal. Prevent from entering sewers, waterways or confined spaces. Collect in suitable containers (plastic, iron or stainless steel), and carefully dilute with water or cautiously neutralize with dilute hydrochloric acid. Flush area of spill thoroughly with copious amounts of running water.
Waste Disposal: Dispose of in compliance with local, provincial and federal regulations.
Handling Procedures and Equipment: CORROSIVE, TOXIC. Before working with this product, ensure that engineering controls are operating. Workers using this chemical must be properly trained in its hazards and its safe use. Material will attack copper, tin, zinc and their alloys, and some forms of rubber, plastics, and coatings; ensure that equipment is resistant. Use the smallest amount possible for the purpose in an area with adequate ventilation. Avoid generating dust or vapours. Maintain temperature <50 °C. Avoid contact. Empty containers may contain hazardous residues; treat with caution.
Storage Requirements: Store in cool, dry, well-ventilated area, out of direct sunlight, and away from heat or ignition sources and incompatible materials. Maintain temperature <50 °C. Keep away from incompatible materials. Storage area should be constructed of fire-resistant materials, with sealed floors to prevent absorption, and with raised sills or a trench to a safe location. Walls, floors, shelving, fittings, lighting and ventilation systems should be made of resistant materials, such as carbon steel or stainless steel. Keep containers tightly closed. Protect from damage; inspect regularly for signs of damage.

FIRST AID MEASURES

Specific Measures:
Eyes: Immediately flush eyes with warm running water for at least sixty (60) minutes, holding eyelids open while flushing. Do not interrupt flushing. Avoid flushing contaminated water into unaffected eye. Wear gloves to avoid contact. Flushing may be continued while casualty is transported to medical facility. Get medical attention immediately.
Skin: Remove contaminated clothing. IMMEDIATELY flush the exposed area with large amounts of running water for at least sixty (60) minutes. Wear gloves to avoid contact. Take care not to flush contaminated water into the unaffected eye. Get medical attention immediately. Decontaminate clothing before reuse.
Inhalation: Remove to fresh air immediately. Rescuer should take precaution to limit his own exposure. Give oxygen for breathing difficulty. If breathing has stopped, give artificial respiration. If breathing and pulse are absent begin CPR. Get medical attention immediately. Continue observation of the victim; symptoms of pulmonary edema may be delayed up to 24 hours.
Ingestion: Do not induce vomiting. If casualty is alert and not convulsing, rinse mouth with water and give 1 to 2 glasses of water or milk to dilute material. Get medical attention immediately. If vomiting occurs, keep head below hips to help prevent aspiration. Rinse mouth and give more water or milk to drink.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997
CCINFO disc: MSDSs
Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 3, 1990
Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987
Suppliers Material Safety Data Sheets:

ADDITIONAL INFORMATION

Date Issued: 10-Mar-89
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Proposed WHMIS Designation: D1B; E
Prepared by: Caledon Laboratories Ltd. (905) 877-0101