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MATERIAL
SAFETY
DATA SHEET

No. 41

PRODUCT NAME Monomethylamine	**CAS #** 74-89-5
TRADE NAME AND SYNONYMS Methylamine, anhydrous (D.O.T.); MMA; Aminomethane	**DOT I.D. No.:** UN 1061 (RQ 100/45.4)
CHEMICAL NAME AND SYNONYMS Methylamine, Amino Methane	**DOT Hazard Class:** Division 2.1
ISSUE DATES AND REVISIONS Revised September 1996	**Formula** CH_2NH_2 **Chemical Family:** Alkyl Amine

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

5 Molar PPM; STEL = 15 Molar PPM. PPM (ACGIH 1995-1996). OSHA 1995 PEL (8 Hr. TWA) = 10 Molar PPM.

SYMPTOMS OF EXPOSURE

Corrosive and irtitating to the upper and lower respiratory tracts, skin and eyes. Mild concentrations may cause skin irritation, conjunctivitis or bronchitis; while higher concentrations could result in chemical pneumonitis, pulmonary edems, and skin burns or eye damage. Inhalation may also cause shortness of breath, headache, nausea, and vomiting. Severe destruction of tissues will result from prolonged exposure.

TOXICOLOGICAL PROPERTIES

Oral LD_{50} = 100-200 mg/kg (10% solution in rats)
Inhalation LC_{50} = 5,000 ppm/1 hr (in rats)
Subcutaneous LD_{LO} = 2,500 mg/kg (in mice)

Monomethylamine is irritating and corrosive to all living tissues. Toxic level exposure to dermal tissue causes severe burns. High level concentrations are extremely destructive to the airway and eyes. Inhalation may have fatal consequences as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and (Continued on Page 4)

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO MONOMETHYLAMINE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.

Inhalation: Conscious persons should be assisted to an uncontaminated area ard inhale fresh air. Quici; removal from the contaminated area.is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO MONOMETHYLAMINE SHOULD NOT WEAR CONTACT LENSES. (Continued on Page 4)

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Prolonged direct contact with mercury will produce explosive compounds. Reacts violently when mixed with oxidizing agents such as perchlorates, nitrates, permanganates, chromates, nitric acid, halogens and

PHYSICAL DATA

BOILING POINT 20.6°F (-6.3°C)	**LIQUID DENSITY AT BOILING POINT** 43.3 lb/ft^3 (694 kg/m^3)
VAPOR PRESSURE @ 70°F (21.1 C) = 44.1 psia (304 kPa)	**GAS DENSITY AT 70°F. 1 atm** 0.0802 lb/ft^3 (1.284 kg/m^3)
SOLUBILITY IN WATER Soluble	**FREEZING POINT** -136.3°F (-93.5°C)
EVAPORATION RATE (Butyl acetate = 1) = greater than l; 99.9 + % volatile	**SPECIFIC GRAVITY (AIR=1)** @ 70°F (21.1°C) = 1.07

APPEARANCE AND ODOR Colorless liquid or gas with strong, fishy, ammonia-like odor.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) 32°F (0°C) Closed Cup	**AUTO IGNITION TEMPERATURE** 806°F (430°C)	**FLAMMABLE LIMITS % BY VOLUME (See Page 4)** LEL 4.9 UEL 20.7
EXTINGUISHING MEDIA Water, carbon dioxide, dry chemical		**ELECTRICAL CLASSIFICATION** Class 1, Group B

SPECIAL FIRE FIGHTING PROCEDURES

Fire fighters should wear self-contained breathing apparatus and butyl rubber boots. If possible, stop the flow of monomethylamine. Use water spray to cool surrounding containers. If water is used as extinguishing media, recognize that aqueous solutions of monomethylamine are also flammable.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Monomethylamine is slightly heavier than air and may travel a considerable distance to a source of ignition. Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable mixture formation in low areas or pockets.

REACTIVITY DATA

STABILITY		**CONDITIONS TO AVOID**
Unstable		None
Stable	X	

INCOMPATIBILITY (Materials to avoid) Mercury, silver, copper and its alloys, tin, commercial nickel, zinc and its alloys, oxidizinq compounds.

HAZARDOUS DECOMPOSITION PRODUCTS None

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
May Occur		None
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD

Do not attempt to dispose of waste or unused quantities. Return in the shipping containet properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier. For emergency disposal assisstance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION Hood with forced ventilation	**LOCAL EXHAUST** To prevent accumulation above the TWA	**SPECIAL** N/A
	MECHANICAL (Gen.) In accordance with electrical codes	**OTHER** N/A
PROTECTIVE GLOVES Butyl rubber, PVC or polyethylene		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash "fountain", face shield and polyethylene, PVC or butyl rubber apron.		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Methylamine, anhydrous DOT Hazard Class: Division 2.1
DOT Shipping Label: Flammable Gas I.D. No.: UN 1061 (RQ 100/45.4)

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. Valve protection caps must remain in place unless `container is secured with valve outlet piped to use point. Do not drag, slide or roll I cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing I requlator when connecting cylinder to lower pressure (<100 psig) piping or systems. Do not heat cylinder by any means, to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.

For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.

SPECIAL PACKAGING RECOMMENDATIONS

Carbon steel, stainless steel and Monel® are acceptable for use with monomethylamine. Most other metals are not compatible - particularly silver, copper and its alloys, tin, nickel and zinc and its alloys. Lead is the preferred gasket material. Natural rubber, Buna S®, Buna N® and cellulose acetate are not acceptable plastics or elastomers to use.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Earth-ground and bond all lines and equipment associated with the monomethylamine system Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page 4)

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

HEALTH HAZARD DATA

TOXICOLOGICAL PROPERTIES: (Continued)

pulmonary edema. Eye burns result in ulceration of the conjunctivae and cornea and may cause destruction of all ocular tissue.

Monomethylamine is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.

Persons in ill health where such illness would be aggravated by exposure to monomethylamine should not be allowed to work with or handle this product.

RECOMMENDED FIRST AID TREATMENT: (Continued)

Flush contaminated eye(s) with copious quantities of water. Part eyelids with fingers to assure complete flushing. Continue for minimum of 15 minutes.

Skin Contact: Flush affected areas with copious quantities of water. Remove affected clothing as rapidly as possible. A physician should see the patient and be informed that the ‘‘burn” was caused by an alkaline solution. A weak (1-2%) acetic acid solution or vinegar may be used as a counteractant.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. NEYER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 NO. for monomethylamine = 3 4 O None