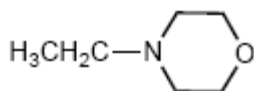


Technical Bulletin**N-ETHYLMORPHOLINE (NEM)**

NEM is a clear, low-color, water miscible, liquid, tertiary amine.

**SALES SPECIFICATIONS**

<u>Property</u>	<u>Specifications</u>	<u>Test Method*</u>
Appearance	Clear and substantially free of foreign matter	ST-30.1
Color, Pt-Co	30 max.	ST-30.12
NEM, wt%	99 min.	ST-5.5
Water, wt%	0.2 max.	ST-31.53, 6

*Methods of Test are available from Huntsman Corporation upon request.

ADDITIONAL INFORMATION**Regulatory Information**

DOT/TDG Classification	Polyamines, flammable corrosive, n.o.s. (N-Ethylmorpholine)
HMIS Code	3-3-0
WHMIS Classification	B2, E
CAS Number	100-74-3

Chemical Control Laws

Australia, AICS	Listed
Canada, DSL	Listed
Europe, EINECS/ELINCS	Listed
Japan, METI	Listed
United States, TSCA	Listed

Typical Physical Properties

Boiling point, °C (°F)	138 (280)
Flash point, TCC, °C (°F)	32 (90)
Melting point, °C (°F)	-63 (-81)
pH	10.9
Specific gravity, 20/20°C	0.9
Vapor pressure, mm Hg, 20°C (68°F)	5
Viscosity, cSt, 20°C (68°F)	1.2
Water solubility (%)	> 10

TOXICITY AND SAFETY**Acute Toxicity**

The results of acute toxicity testing using n-ethylmorpholine (NEM) indicate that this product is considered to be moderately toxic by single oral exposures and slightly toxic by single dermal exposures. The oral LD₅₀ in rats and the dermal LD₅₀ in rabbits are 1.11 g/kg and 1.98 g/kg, respectively. Acute irritation studies have shown this product to be extremely irritating/corrosive to the skin of rabbits, with a Draize dermal irritation score of 8.0 (maximum score 8.0). Given the results of the dermal irritation study, it is assumed that NEM will be extremely irritating and corrosive to the eyes, as well.

Genetic Toxicity

A battery of genetic toxicity studies, comprised of an Ames Assay, a Mouse Lymphoma Forward Mutation Assay and a Cell Transformation Assay (BALB/3T3 cells) were conducted using n-ethylmorpholine. These studies were negative (non-genotoxic) in their responses to NEM.

Human Health Effects and First Aid On the basis of the above animal toxicity studies, the principal health hazard from accidental exposures to n-ethylmorpholine is a moderate to severe irritation/corrosion of the eyes, skin, and mucous membranes. Chemical-type goggles with face shield must be worn during handling or use of the undiluted product or concentrated solutions. Contact lenses should not be worn. Protective clothing, and gloves resistant to chemicals and petroleum distillates, must be worn. Should accidental eye and skin contact occur, flush eyes with large amounts of water for at least 15 minutes, after which a physician should be consulted. During flushing of the eyes, eyelids should be held apart to permit rinsing of entire surface of eye and lids. For skin contact, immediately

flush skin with large amounts of water for at least 15 minutes. Clothing wet with the product must be removed immediately and laundered before reuse.

If NEM is accidentally ingested, and the individual is conscious and can swallow, they should be given two large glasses of water, after which a physician should be consulted. Since this product is expected to produce severe irritation/corrosion of mucous membranes, vomiting should not be induced, due to the possibility of lung damage from aspiration of the product into the lungs during vomiting.

Under usual circumstances, exposure to harmful quantities of vapor should not be a health problem, however, exposure to appreciable concentrations of n-ethylmorpholine vapors has been shown to result in irritation to the eyes, nose and throat, and may produce corneal edema and temporary and reversible hazy or blurred vision. These symptoms disappear when exposure to NEM is terminated. Adequate ventilation should be provided where a large quantity of product is exposed, or where mists or vapors are generated. Spills in confined areas should be cleaned up promptly, using appropriate personal protective equipment.

The American Conference of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV) for NEM at 5 ppm as an 8-hour time weighted average (TWA) and has included a "SKIN" notation. For further information, please refer to the Material Safety Data Sheet (MSDS) for this product. Contact lenses should not be worn. Protective clothing, and gloves resistant to chemicals and petroleum distillates, must be worn. Should accidental eye and skin contact occur, flush eyes with large amounts of water for at least 15 minutes, after which a physician should be consulted. During flushing of the eyes, eyelids should be held apart to permit rinsing of entire surface of eye and lids. For skin contact, immediately flush skin with large amounts of water for at least 15 minutes. Clothing wet with the product must be removed immediately and laundered before reuse.

HANDLING AND STORAGE

In order to maintain the high degree of purity with which n-ethylmorpholine (NEM) is manufactured and shipped, the following storage and handling considerations are recommended:

Dry Inert Gas Blanket: This product should be stored under a dry inert gas blanket, such as nitrogen, to minimize contamination resulting from contact with air and water.

Materials of Construction: Clean carbon steel is satisfactory as a material of construction for storage tanks and transfer systems, provided adequate precautions are observed to guard against rust contamination. In those cases where additional precautions are needed to preserve low color, stainless steel or aluminum should be used. Copper, or alloys containing copper, should be avoided.

Storage Temperature: NEM has an extremely low viscosity and freezing point (-73.5°F). It will not freeze or become viscous during normal handling even though subjected to very severe weather conditions.

Spills or Leaks: Eliminate all sources of ignition in case of spills or leaks. Spills should be removed by absorbent materials or by washing with water.

Flammability: For transportation purposes, NEM is classed as a *flammable liquid* (closed cup flash point, 90°F). Because of the flammable nature of NEM, the product should be used only in a well-ventilated area and precautions should be taken to avoid exposure to sparks and open flames.

AVAILABILITY

NEM is available in bulk and in 55-gallon drums. Samples are available by contacting our sample department at 1-800-662-0924.

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Samples 1-800-662-0924

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