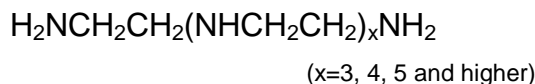


Technical Bulletin

ETHYLENEAMINE E-100 (E-100)

ETHYLENEAMINE E-100 is a mixture of tetraethylenepentamine (TEPA), pentaethylenhexamine (PEHA), hexaethylenheptamine (HEHA), and higher molecular weight products. E-100 is a complex mixture of various linear, cyclic, and branched products with a number-average molecular weight of 250-300 g/mole.



APPLICATIONS

- Asphalt additives
- Corrosion inhibitors
- Epoxy curing agents
- Lube oil and fuel additives
- Mineral processing aids

SALES SPECIFICATIONS

<u>Property</u>	<u>Specifications</u>	<u>Test Method*</u>
Appearance	Amber to brown clear liquid, substantially free of foreign matter	ST-30.1
Suspended matter/sediment, vol%	0.1 max.	ST-30.108
Tetraethylenepentamine, wt%	5.0 – 15.0	ST-35.222
Viscosity, cSt, 40°C	70 – 110	ST-30.6
Water, wt.%	0.50 max.	ST-31.53, 6

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

ADDITIONAL INFORMATION

Regulatory Information

See MSDS for inventory status and other regulatory information.

Typical Properties

Amine value, mg KOH/g	1257
Boiling point, 760 mm Hg, °C (°F)	>250 (>482)
Density, g/ml, 20°C	1.009
Dielectric constant, 25°C and 1 kHz	9.6
Electrical conductivity, µmhos/cm, 24°C	0.24
Flash point, PMCC, °C	>182 (359.6)
Ionization constants, K _b 1, 25°C	9.0E-5
Kinematic viscosity, cSt, 25°C	229
Kinematic viscosity, cSt, 40°C	84.1
Nitrogen content, %	33.7
pH	11-12
Refractive index, 25°C	1.511
Specific gravity, 25/25°C	1.02
Vapor pressure, mm Hg, 20°C (68°F)	< 1
Water solubility, %	>10

TOXICITY AND SAFETY

Because of the fragility of eye tissue, almost any eye contact with any ethyleneamine may cause irreparable damage, even blindness. A single, short exposure to ethyleneamines, may cause severe skin burns, while a single, prolonged exposure may result in the material being absorbed through the skin in harmful amounts. Exposures have caused allergic skin reactions in some individuals. Single dose oral toxicity of ethyleneamines is low. The oral LD₅₀ for rats is in the range of 1000 to 4500 mg/kg for the ethyleneamines.

The principal hazards that arise in working with Ethyleneamine E-100 are those associated with similar organic amines; namely, a corrosive action on skin and eyes. Precautions should be taken to prevent contact with these parts of the body such as by use of protective clothing and chemical goggles. If contact occurs, immediately flush the exposed area with plenty of water for at least 15 minutes. Eye exposures should be examined by a physician. Contaminated clothing should be laundered before reuse. If ingestion occurs, do not induce vomiting. Have the individual drink a large amount of water (or milk, if it is readily available) and transport them to a medical facility immediately.

HANDLING AND STORAGE

In order to maintain the high degree of purity with which Ethyleneamine E-100 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

Recommended storage construction for E-100 is stainless steel or carbon steel. If slight coloration of the ethyleneamine is acceptable, storage tanks may be made of carbon steel or black iron, provided they are free of rust and mill scale. However, if the amine is stored in such tanks, color may develop due to iron contamination. If iron contamination cannot be tolerated, tanks constructed of types 304 or 316 stainless steel should be used. (Note: Because they are quickly corroded by amines, do not use copper, copper alloys, brass, or bronze in tanks or lines.)

Storage Temperature

Ethyleneamine E-100 has a pour point of -21°C. To avoid freezing, the product should be maintained above this temperature. At temperatures below 5°C, viscosity becomes so high that the product cannot be easily pumped.

Spills or Leaks

Small spills should be covered with inorganic absorbents and disposed of properly. Organic absorbents have been known to ignite when contaminated with amines in closed containers. Certain cellulosic materials used for spill cleanup such as wood chips or sawdust have shown reactivity with ethyleneamines and should be avoided. Large spills should be contained and recovered. Water may be used for clean-up purposes, but avoid disposing of the material into sewers or natural water bodies. Disposal should be in accordance with all federal, state and local laws, regulations, and ordinances. Ethyleneamine leaks will frequently be identified by the odor (ammoniacal) or by the formation of a white, solid, waxy substance (amine carbamates). Inorganic absorbents or water may be used to clean up the amine waste.

AVAILABILITY

Ethyleneamine E-100 is available in bulk and in 55-gallon drums of 205 Kg net weight. Samples are available by contacting our sample department at 1-800-662-0924.

Huntsman Corporation**Business Offices**

10003 Woodloch Forest Dr.
The Woodlands, TX 77380
(281) 719-6000

**Huntsman Advanced Technology
Center****Technical Service**

8600 Gosling Rd.
The Woodlands, TX 77381
(281) 719-7780

Samples 1-800-662-0924

www.huntsman.com

5009-0414

Copyright © 2007, 2008, 2010, 2013, 2014 Huntsman Corporation or an affiliate thereof. All rights reserved.

Huntsman Corporation warrants only that its products meet the specifications stated herein. Typical properties, where stated, are to be considered as representative of current production and should not be treated as specifications. While all the information presented in this document is believed to be reliable and to represent the best available data on these products, HUNTSMAN MAKES NO WARRANTY OR GUARANTEE OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT OF ANY THIRD PARTY, OR WARRANTIES AS TO QUALITY OR CORRESPONDENCE WITH PRIOR DESCRIPTION OR SAMPLE, AND ANY USER OF PRODUCTS DESCRIBED HEREIN SHOULD CONDUCT A SUFFICIENT INVESTIGATION TO ESTABLISH THE SUITABILITY OF ANY PRODUCT FOR ITS INTENDED USE AND ASSUMES ALL RISK AND LIABILITY WHATSOEVER RESULTING FROM THE USE OF SUCH PRODUCT, WHETHER USED SINGLY OR IN COMBINATION WITH OTHER SUBSTANCES. Product(s) described in this publication may be hazardous and/or toxic and require special precautions in handling. For all product(s) described herein, the user should obtain from Huntsman detailed information on hazards and/or toxicity, together with proper shipping, handling, and storage procedures, and should comply with all applicable safety and environmental standards. The behavior, hazards and/or toxicity of the product(s) referred to in this publication in manufacturing processes and their suitability in any given end-use environment are dependent upon various conditions such as chemical compatibility, temperature, and other variables, which may not be known to Huntsman. It is the sole responsibility of the user of such product(s) to evaluate the manufacturing circumstances and the final product(s) under actual end-use requirements and to adequately advise and warn future purchasers and users thereof.