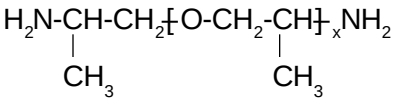
Technical Bulletin

HUNTSMAN

JEFFAMINE® D-230 POLYOXYPROPYLENEDIAMINE

[CAS 9046-10-0]

STRUCTURE



x = 2.6

DESCRIPTION

JEFFAMINE D-230 polyoxypropylenediamine is one of a family of Huntsman Corporation's polyamines having as their backbones repeated oxypropylene units. As shown by the above structure, JEFFAMINE D-230 is a difunctional primary amine having an average molecular weight of approximately 230. Its amine groups are located on secondary carbon atoms at the ends of an aliphatic polyether chain.

JEFFAMINE D-230 is light in color, low in viscosity and vapor pressure, high in primary amine content, and completely miscible in a wide variety of solvents, including water.

SALES SPECIFICATIONS

Appearance	Colorless to slight yellow with slight haze
Color, Pt-Co	100 max.
Total acetylatables, meq/g	8.3 min. 9.1 max.
Primary amine, % of total amine	97 min.
Total amine, meq/g	8.1 min. 8.7 max.
Water, %	0.25 max.

TYPICAL PHYSICAL PROPERTIES

Brookfield viscosity, cps, 25°C (77°F)	9
Specific gravity, 20/20°C	0.9480
Density, lb/gal, 20°C	7.9
Refractive index, n_D^{20}	1.4466
Flash point, PMCC, °C (°F)	121 (250)
Vapor pressure, mm Hg/°C	1/100 10/133
pH, 5% aqueous solution	11.7
Equivalent weight with epoxies ("Amine hydrogen equivalent weight," or AHEW)	60

AVAILABILITY

JEFFAMINE D-230 is available in tank cars, tank wagons, 55-gallon drums of 430 pounds net weight, and 5-gallon cans. Samples are available from any Huntsman Corporation sales office.

APPLICATIONS

JEFFAMINE D-230 polyoxypropylenediamine undergoes reactions typical of primary amines. Because of its unique structure, however, JEFFAMINE D-230 has found its most significant use as an epoxy curing agent. The use of JEFFAMINE D-230 leads to tough, clear, impact-resistant coatings, castings, and adhesives. Examples include coatings for decoupage and furniture, reinforced composites, electrical encapsulation, and lamination. Coatings made with unmodified JEFFAMINE D-230 are free of the surface "blush" prevalent with many amine curing agents. JEFFAMINE D-230 has found its way into

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miniature medical devices, industrial floors, boat construction, decorator clocks, and space vehicles.

Epoxies formulated with JEFFAMINE D-230 can be readily modified because JEFFAMINE D-230 is compatible with a wide range of modifiers and curing agents, including other JEFFAMINE products.

Amidation of JEFFAMINE D-230 with a variety of aliphatic and aromatic carboxylic acids is readily accomplished by known techniques. The resulting poly-amides are of interest as "hot melt" adhesives, for example.

As a primary amine, JEFFAMINE D-230 reacts quickly with isocyanates. The reaction can be managed, however, if small quantities are used (e.g., as a viscosity modifier) or if quick-mix equipment (e.g., RIM) is employed.

Salts may be formed readily which have potential use, e.g., as surfactants and fire retardants.

The reactivity of JEFFAMINE D-230 may be modified by cyanoethylation, a reaction which proceeds readily and cleanly. Polyurea coatings have been made from the cyanoethylated derivative.

STORAGE AND HANDLING

Materials of Construction:

At temperatures of 75-100°F

Tanks	Carbon steel
Lines, valves	Carbon steel
Pumps	Carbon steel
Heat exchange surfaces	Stainless steel
Hoses	Stainless steel, polyethylene, polypropylene, Teflon
Gaskets, packing	Polypropylene or Teflon; elastomers such as neoprene, Buna N, and Viton should be avoided
Atmosphere	Nitrogen or dry air

At temperatures above 100°F

Tanks	Stainless steel or aluminum
Lines, valves	Stainless steel
Pumps	Stainless steel or Carpenter 20 equivalent
Atmosphere	Nitrogen

While JEFFAMINE D-230 may be stored under air at ambient temperatures for extended periods, a nitrogen blanket is suggested for all storage in case of accidental high temperatures. It should be noted that pronounced discoloration is likely to occur at temperatures above 140°F, whatever the gaseous pad.

Clean-out of lines and equipment containing JEFFAMINE D-230 is easy; warm water and steam is all that is required.

In the event of spillage of this product, the area may be flushed with water. The proper method of disposal of waste material is by incineration with strict observance of all federal, state, and local regulations.

SAFETY AND TOXICITY

JEFFAMINE D-230 should be considered hazardous, having the potential to cause skin burns and eye irritation. Chemical-type goggles with face shield and impervious gloves must be worn when handling this product. Should accidental contact occur, flush the eyes thoroughly with water for at least 15 minutes and get immediate medical attention. In case of skin contact, immediately wash the exposed area with soap and plenty of water. If drenched, remove contaminated clothing under a safety shower. Wash clothing before reuse.

JEFFAMINE D-230 is considered moderately toxic if swallowed or absorbed through the skin. The single oral dose LD_{50} value in rats is 1.66 g/kg and the single dermal LD_{50} value in rabbits is 0.76 g/kg. The Draize score for skin irritation in rabbits is 8.0/8.0 and the product has been determined to be corrosive to the skin by the DOT 4-hour test. The Draize score for eye irritation in the rabbit is estimated to be 80-110/110.0.

In normal operations, the vapor pressure of JEFFAMINE D-230 is sufficiently low that no significant concentrations would be present in the workplace atmosphere. However, supplied air respiratory protection is recommended for cleaning large spills or for entry into confined spaces.

JEFFAMINE D-230 has been found to be inactive with respect to mutagenicity in the Ames *Salmonella*/microsome plate test, the Balb/3T3 *in vitro* cell transformation assay, and the mouse lymphoma forward mutation assay.

For futher information, request the Material Safety Data Sheet.