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Product Information

DIETHANOLAMINE, ACS REAGENT

Sigma Prod. No. D2286

39,817-9 is an exact replacement for D 2286

STRUCTURE: HO-CH₂-CH₂-NH-CH₂-CH₂-OH

CAS NUMBER.: 111-42-2

SYNONYMS: bis(2-hydroxyethyl)amine; DEA; 2,2'-iminobisethanol;
2,2'-iminodiethanol; diethylolamine

PHYSICAL DESCRIPTION:

Appearance: Clear to very slightly hazy liquid - colorless to very faint yellow

Molecular formula: C₄H₁₁NO₂

Molecular weight: 105.1

Melting point: 28°C, so may be a solid or viscous liquid

Water content: ≤ 0.15% (by Karl Fischer)¹

Specific gravity: (based on water at 4°C) at 30°C is 1.088, and at 60°C is 1.069.² Molarity of the melted liquid is 10.4 M.

pK_a = 8.88 (Water) at 25°C³

ΔpK_a/ΔT = -0.025.⁴ An aqueous solution of 0.1 N has pH approximately 11.²

Purity: ≥98.5% by titration (specification defined by the American Chemical Society (ACS))

STABILITY / STORAGE AS SUPPLIED:

The product should be stored protected from moisture and carbon dioxide, since diethanolamine is hygroscopic and basic. If stored sealed at room temperature, the product is expected to show minimal change over several year.

SOLUBILITY / SOLUTION STABILITY:

Sigma tests diethanolamine in water at 50 mg/mL to see a clear colorless solution. It has limited solubility in organic solvents: 4.2% in benzene, 0.8% in ether, <0.1% in CCl₄, and <0.1% in n-heptane.² It is reportedly miscible with alcohol, acetone, chloroform and glycerol.⁵

USAGE / APPLICATIONS:

Diethanolamine is an organic base which has been used as an emulsifying and dispersing agent.⁵ It can also be used as a basic buffer, with optimal pH about pH 9, if titrated with HCl or other acid. Other uses include: to "scrub" gases, as a chemical intermediate, as humectant or softening agent.²

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REFERENCES:

1. *Reagent Chemicals*, 8th Ed., p. 301-302 (1993).
2. *Merck Index*, 11th Ed., #3097 (1989) or 12th Ed., #3156 (1996).
3. *Lange's Handbook of Chemistry*, 13th Ed., p. 5-32.
4. *Fluka Biochemika*, 1989 Ed., p. 429.
5. *Martindale: The Extra Pharmacopoeia*, 30th Ed., p. 1361 (1993).