EASTMAN

# Eastman's specialty alkyl alkanolamines (AAAs) and alkyl hydroxylamines

## Adding value to diverse applications and markets

Formulators and others looking for high-quality amines and amine derivatives can turn to Eastman's range of specialty alkyl alkanolamines and alkyl hydroxylamines. You can rely on our experience and expertise to provide you with the best solution to meet your needs.

With plants in the United States, China, and Belgium, Eastman is the world's largest producer of basic alkyl alkanolamines like DMAE and MDEA. We also make a series of useful short-chain specialty alkanolamines (amino alcohols).

These amino alcohols have interesting physical properties and structures and serve as raw materials and additives in a wide variety of markets including pharmaceuticals, water treatment, hydraulic fluids, metalworking fluids, coatings, and inks. For example, EAE is used as a solvent in carbon capture (CCS) as well as an intermediate for hydroxychloroquine—a common drug for malaria and other diseases. DEAE, morpholine, and cyclohexylamine are the three most common amines used in boiler water treatment to prevent corrosion. IPAE and BAE are commonly used in industrial lubricants such as metalworking fluids or water-based hydraulic fluids. Our newest amine, MDIPA, is used to make fabric softeners and other surfactants.

### DEHA

Eastman has made DEHA in the U.S. for almost 50 years and remains the world's largest producer—and the only producer in the Americas. DEHA is a very powerful oxygen and free radical scavenger used in boiler water treatment, polymer production, and photographic chemicals as a color stabilizer for various products. It is also used in other markets and applications.

## Specialty alkyl alkanolamines (AAA)

### Products

**Ethyls**

- Ethylaminoethanol (EAE)
- Ethyldiethanolamine (EDEA)*
- Diethylaminoethanol (DEAE)

**Propyls**

- Isopropylaminoethanol (IPAE, mixed isomers)
- Diisopropylaminoethanol (DIPAE)*

**Butyls**

- *n*-Butylaminoethanol (BAE)
- *t*-Butylaminoethanol (TBAE)
- *t*-Butyldiethanolamine (TBDEA)*
- *n*-Butyldiethanolamine (BDEA)
- Di-*n*-butylaminoethanol (DBAE)

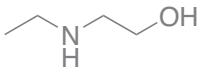
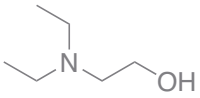
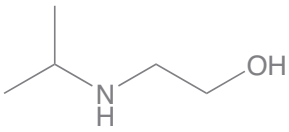
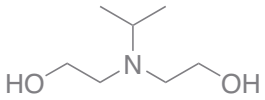
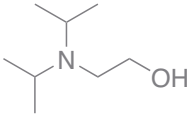
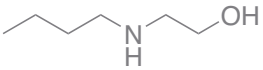
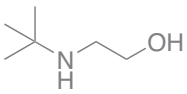
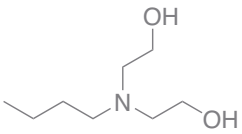
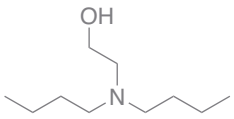
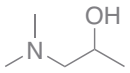
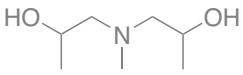
**Alkyl propanols**

- Dimethylamino-2-propanol (DMA 2P, anhydrous)
- Dimethylamino-2-propanol (DMA 2P, 77% aqueous)
- Methyldiisopropanolamine (MDIPA)

**Can be produced based on significant customer need. Contact us to discuss these or other AAAs (e.g., C5+).*

### Applications

- Metalworking fluids
- Coatings/inks
- Photographic chemicals
- Acrylic monomers
- Gas treatment
- Boiler water treatment
- Industrial lubricants like hydraulic fluids
- Fabric softeners, car wash cleaners, and other surfactant applications
- Electronics

| | |
|---|---|
| Ethylaminoethanol (EAE) |  |
| Diethylaminoethanol (DEAE) |  |
| Isopropylaminoethanol (IPAE, mixed isomers) |  Isopropylaminoethanol (70%)  Isopropylaminodiethanol (30%) |
| Diisopropylaminoethanol (DIPAE)* |  |
| *n*-Butylaminoethanol (BAE) |  |
| *t*-Butylaminoethanol (TBAE) |  |
| *n*-Butyldiethanolamine (BDEA) |  |
| Di-*n*-butylaminoethanol (DBAE) |  |
| Dimethylamino-2-propanol (DMA2P, anhydrous) |  |
| Methyldiisopropanolamine (MDIPA) |  |

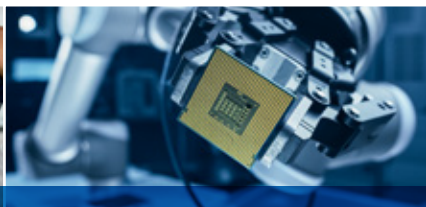



## Physical properties

| Product | Formula (commercial specification) | CAS | GMW | Density (22°C), g/mL | pKa[a] | Flash point, °F (°C) | Solubility in water | Vapor pressure, mm Hg | Boiling point, °C |
|---|---|---|---|---|---|---|---|---|---|
| Diethylaminoethanol (DEAE) | $(Et)_2NCH_2CH_2OH$ (99.6%) | 100-37-8 | 117.2 | 0.882 | 9.95 | 125[b] (52) | Miscible | 1.4 | 161 |
| Diisopropylaminoethanol (DIPAE) | $(iPr)_2NCH_2CH_2OH$ (99%) | 96-80-0 | 145.2 | 0.873 | 10.13 | 153[c] (67) | 9.2% | <1 | 188–192 (commercial) |
| Ethylaminoethanol (EAE) | $EtNHCH_2CH_2OH$ (98%) | 110-73-6 | 89.1 | 0.916 | 10.07 | 159[c] (70) | Miscible | <1 | 170 |
| Dimethylamino-2-propanol (DMA 2P) | $(Me)_2NCH_2CHOHCH_3$ (99%) | 108-16-7 | 103.2 | 0.851 | 9.53 | 82[b] (28) | Miscible | 20 | 121–127 (commercial) |
| Dimethylamino-2-propanol 77% (DMA 2P 77% mixed) | $(Me)_2NCH_2CHOHCH_3$ (76%–78%, aqueous) | 108-16-7 | 103.2 | 0.914 | 9.53 | 99[b] (37) | Miscible | 20 | 96 (azeotrope) |
| Di-*n*-butylaminoethanol (DBAE) | $(Bu)_2NCH_2CH_2OH$ (99%) | 102-81-8 | 173.3 | 0.858 | 9.95 | 201[c] (94) | 0.4% | <0.1 | 230 |
| Isopropylaminoethanol, mixed (IPAE mixed)[d] | $iPrNHCH_2CH_2OH$ (70%) $iPrN(CH_2CH_2OH)_2$ (30%) (99%) | 109-56-8 121-93-7 | 103.2 147.2 | 0.929 | 9.88 | 168[c] (75) | Miscible | 2 | 110–265 (commercial) |
| *n*-Butylaminoethanol (BAE) | $BuNHCH_2CH_2OH$ (99%) | 111-75-1 | 117.2 | 0.892 | 10.03 | 205[c] (96) | Miscible | <0.1 | 199 |
| *n*-Butyldiethanolamine (BDEA) | $BuN(CH_2CH_2OH)_2$ (99%) | 102-79-4 | 161.3 | 0.968 | 8.91 | 286[b] (141) | Miscible | <<0.01 | 274 (741 mm Hg) |
| *t*-Butylaminoethanol (TBAE) | $tBuNHCH_2CH_2OH$ (99%) | 4620-70-6 | 117.2 | 0.869 | 10.24 | 156[c] (69) | Miscible | <1 | 175 (mp = 43°C) |
| Methyldiisopropanolamine (MDIPA) | $MeN(CH_2CHOHCH_3)_2$ (90%) $MeN(CH_2CHOHCH_3)(CHCH_3CH_2OH)$ (10%) (98%) | 4402-30-6 85154-18-3 | 147.2 | 0.958 | 8.88[e] | 241[c] (116) | Miscible | 0.04[f] | 226 |

*[1]Measurements refer to the protonated amine at 25°C in aqueous solution.*
*[2] Flash points were determined by the TAG closed cup method.*
*[3]Flash points were determined by the Pensky-Martens closed cup method.*
*[4]This product is a mixture of 70% wt/wt n-alkylmonoethanolamine and 30% wt/wt n-alkyldiethanolamine. The material has an average GMW of 114.5–117.5 (a.k.a. combining weight).*
*[5]SciFinder (predicted): most basic at 25°C*
*[6]SciFinder (predicted): at 25°C*



# DEHA

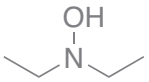
## Products

**Ethyls**

- Diethylhydroxylamine (DEHA, 85% aqueous)
- Diethylhydroxylamine (DEHA, anhydrous)
- Term-N-ator™ P (branded; FDA-approved for food contact and patented DEHA for PVC short stopper use only in the Americas)

## Applications

- Boiler water treatment
- SBR/PVC production
- Oil-field chemicals
- Chemical processing
- Photographic chemicals
- Radical scavenging
- Color inhibition

| | |
|---|---|
| Diethylhydroxylamine (DEHA) |  |



## Physical properties

| Product | Formula (commercial specification) | CAS | GMW | Density (22°C) | pKa[a] (22°C) | Appearance | Flash point,[b] °F (°C) | Solubility in water (20°C) | Vapor pressure (25°C), mm Hg | Boiling point (pure material) (760 mm Hg),[b] °C |
|---|---|---|---|---|---|---|---|---|---|---|
| DEHA, 85% solution | (Et)2NOH (85%, aqueous) | 3710-84-7 | 89.1 | 0.898 | 5.61 | Clear to light yellow liquid | 115 (46) | 35 | 32 | 125–130 with decomposition |
| DEHA anhydrous | (Et)2NOH (98%) | 3710-84-7 | 89.1 | 0.870 | 5.61 | Clear to light yellow liquid | 122 (50) | 35 | 5 | 133 with decomposition |

[a]*This value was generated by an ACD calculation.*
[b]*Flash points were determined by the TAG closed cup method.*

EASTMAN
The results of insight™

**Eastman Corporate Headquarters**
P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, +(1) 423-229-2000

**www.eastman.com/locations**