2-DIETHYLAMINOETHANOL

CAS number: 100-37-8

Synonyms: Diethylaminoethanol, DEAE, 2-diethylaminoethyl alcohol, N,N-diethylethanolamine, 2-hydroxytriethylamine

Chemical formula: $C_6H_{15}NO$

Workplace exposure standard (interim)

TWA: **1 ppm (4.8 mg/m^3)**

STEL: **—**

Peak limitation: **—**

Notations: **Sk.**

IDLH: **100 ppm**

Sampling and analysis: The recommended value is quantifiable through available sampling and analysis techniques.

Recommendation and basis for workplace exposure standard

A TWA of 1 ppm (4.8 mg/m^3) is recommended to protect for local irritant effects and potential reproductive effects in exposed workers.

Given the limited data available from the primary sources, it is recommended that a review of additional sources be conducted at the next scheduled review.

Discussion and conclusions

2-Diethylaminoethanol (DEAE) is used as a curing agent for resins, as an emulsifying agent (soaps, cosmetics, cutting oils) and as a fabric softener.

Critical effects of exposure include severe irritation of the mucous membranes. There are limited data in humans but a case report of accidental exposure at <200 ppm for a few seconds also resulted in nausea and vomiting. A NOAEC of 10 ppm is reported in a 14 week inhalation study in rats with irritation of the nasal mucosa observed at 25 ppm (ACGIH, 2018; DFG, 2002; NICNAS, 2014). ACGIH derived a TWA of 2 ppm based on this NOAEC. Testicular atrophy was observed in a feeding study in rats.

In absence of robust human data, a TWA of 1 ppm was derived by dividing the NOAEC of 10 ppm in rats with an uncertainty factor of 10 to account for interspecies differences. This concentration is considered sufficiently low to protect for irritant effects and potential reproductive effects.

Given the limited data available in the primary sources, this TWA should be considered as an interim value until further human data are found. Therefore, an investigation of additional data sources is recommended at the next scheduled review.

Recommendation for notations

Not classified as a carcinogen according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Not classified as a skin sensitiser or respiratory sensitiser according to the GHS.

A skin notation is recommended based on evidence of dermal absorption in animals and noting systemic effects are a critical end point.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	***1986***	***TWA: 10 ppm (48 mg/m^3)***
ACGIH	***2001***	***TLV-TWA: 2 ppm (9.6 mg/m^3)***
TLV-TWA recommended to minimise the potential for irritation of the nasal mucosa and CNS effects. TLV is seen as preliminary until additional human data are found. Summary of data: Human data: • Limited data in humans • An accidental human exposure to <200 ppm for a few seconds resulted in nausea and vomiting • Odour threshold of 0.011 ppm. Animal data: • NOAEL of 10 ppm; 6 h/d, 5 d/wk for 14 wk inhalation study in rats: ○ irritation of the nasal mucosa at 25 ppm • Testicular atrophy observed in rats fed 200 ppm in their diet for 2 yr • LD_{50}: 1 mL/kg (rabbits, dermal) • LC_{50}: 5,000 mg/m^3 (1,050 ppm) (mice, 2 h); 4,500 mg/m^3 (945 ppm) (rats, 4 h) • Exposure produces symptoms of CNS depression.		
DFG	***2005***	***MAK: 5 ppm (24 mg/m^3)***
Summary of additional data: • Causes severe irritation of mucous membranes • MAK derived from NOAEL of 10 ppm as per ACGIH (2018) for local irritant effects; systemic-toxic effects are not to be expected at this concentration • Rate of penetration of human skin of 3.44 mg/cm^2.		
SCOEL	***NA***	***NA***
No report.		
OARS/AIHA	***NA***	***NA***
No report.		
HCOTN	***NA***	***NA***
No report.		

Secondary source reports relied upon

Source		Year	Additional information
NICNAS	✓	2014	• LD_{50}: 1,000 mg/kg (guinea pigs, dermal) • Not sensitising to the skin of guinea pigs • LOAEC for local irritation 25 ppm in rats; same study ACGIH (2018) • NOAEC for systemic toxicity 76 ppm in rats; same 14 wk inhalation study ACGIH (2018).

Carcinogenicity — non-threshold based genotoxic carcinogens

Is the chemical mutagenic? No

The chemical is not a non-threshold based genotoxic carcinogen.

Notations

Source	Notations
SWA	Skin
HCIS	NA
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	Skin
DFG	H (skin)
SCOEL	NA
HCOTN	NA
IARC	NA
US NIOSH	NA

NA = not applicable (a recommendation has not been made by this Agency); — = the Agency has assessed available data for this chemical but has not recommended any notations

Skin notation assessment

Calculation	
Adverse effects in human case study:	
Dermal LD_{50} ≤1000 mg/kg:	yes
Dermal repeat-dose NOAEL ≤200 mg/kg:	
Dermal LD_{50}/Inhalation LD_{50} <10:	
In vivo dermal absorption rate >10%:	
Estimated dermal exposure at WES >10%:	
	consider assigning a skin notation

IDLH

Is there a suitable IDLH value available?	Yes

Additional information

Molecular weight:	117.19
Conversion factors at 25°C and 101.3 kPa:	1 ppm = Number mg/m^3; 1 mg/m^3 = Number ppm
This chemical is used as a pesticide:	☐
This chemical is a biological product:	☐
This chemical is a by-product of a process:	☐
A biological exposure index has been recommended by these agencies:	☐ ACGIH ☐ DFG ☐ SCOEL

Workplace exposure standard history

Year	Standard
Click here to enter year	

References

American Conference of Industrial Hygienists (ACGIH®) (2018) TLVs® and BEIs® with 7th Edition Documentation, CD-ROM, Single User Version. Copyright 2018. Reprinted with permission. See the *TLVs® and BEIs® Guidelines section* on the ACGIH website.

Deutsche Forschungsgemeinschaft (DFG) (2007) 2-Diethylaminoethanol – MAK value documentation.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2014): Ethanol, 2-(diethylamino) Human health tier II assessment – IMAP report.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – 2-diethylaminoethanol.