1	CAS No.: 141-43-5	Substance: 2-Aminoethanol

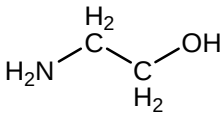
Chemical Substances Control Law Reference No.: 2-301

PRTR Law Cabinet Order No.: 1-16

Molecular Formula: C_2H_7NO

Molecular Weight: 61.10

Structural Formula:



1. General information

The aqueous solubility of this substance is freely miscible, and the partition coefficient (1-octanol / water) (log Kow) is -1.31 (19°C). The vapor pressure is 0.404 mmHg (= 53.9 Pa) (25°C). Degradability (aerobic degradation) is judged to be good.

This substance is a Class 1 Designated Chemical Substance under the Law concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (PRTR Law). It is used primarily as a pH adjustment substance in making synthetic detergent and cosmetics, an antirust substance in machinery cleaner, solvent, gas-absorber, softener of fiber, and material of chemicals. Production of 2-Aminoethanol in 2004 was estimated 43,000 tons (total of monoaminoethanol, diaminoethanol and triaminoethanol), and the export and import quantities in 2004 were estimated 6,091 tons and 1,629 tons, respectively (each value was the total of monoethanolamine and its solt form).

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2. Exposure assessment

Total release to the environment in FY2004 under the PRTR Law came to approximately 1,300 tons. Of this quantity, the amount reported came to 91 tons (7% of the total). Release to the atmosphere accounted for a large part of the reported release. Electrical machinery and equipment, Chemical Industry accounted for high levels of release to the atmosphere. Electrical machinery and equipment and transport equipment reported high levels of release to the public water bodies.

When estimated releases outside notification are included, release to the water bodies accounted for the greatest quantity of release to the environment. The distribution into each environmental medium predicted by means of a multimedia model was 95.7% for water bodies and 3.4% for soil in the case of the region where the estimated release quantity to the environment, atmosphere and the public water bodies was considered to be the maximum.

The predicted maximum exposure concentration for inhalation exposure to human beings was approximately 0.063 μg/m^3. The predicted maximum oral exposure was estimated to be approximately 0.14 μg/kg/day.

Because the 1-octanol/water partition coefficient (log Kow) is low and bioconcentration is also predicted to be low, exposure from environmental media via the food chain is assumed to be low.

The predicted environmental concentration (PEC) that indicates exposure to aquatic organisms was estimated to be 3.5 μg/L for freshwater and generally less than 0.17 μg/L for seawater public water bodies.

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3. Initial assessment of health risk

This substance is corrosive to the skin and eyes, and also corrosive on ingestion. By inhalation, it may cause coughing, headache, shortness of breath and sore throat. On ingestion, it may cause abdominal pains, burning sensation and shock/collapse. Contact with skin or eyes may cause redness, pain and burn. It has CNS effect and may cause lowering of consciousness.

There was insufficient information regarding the carcinogenicity of the substance. For this reason, an initial assessment of the substance was conducted based on information of non-carcinogenic effects.

The 'Non-toxic level' has not been estimated for oral exposure. On the other hand, the lowest observed adverse effect level (LOAEL) of 12mg/m^3 (loss of hair and drowsiness) was obtained for inhalation from medium- and long-term inhalation

toxicity testing for rats. As this was a LOAEL, it was divided by 10, and because of the short testing period, the value was further divided by 10, and a value of 0.12 mg/m^3 was derived as the 'Non-toxic level'.

For oral exposure, because its 'Non-toxic level' could not be determined, its health risk could not be identified. However, in case of intakes of the freshwater public water bodies, the MOE values were estimated to be 23,000 or more, 16,000 or more and 3,600, respectively, from the data obtained from medium- and long-term toxicity testings for rats and dogs, and from rat reproduction and developmental toxicity testings.

As the exposure to this substance through food intakes is estimated minor, even when the exposures through freshwater and food are combined, it would not greatly affect the MOE values. Accordingly, there would be relatively low necessity of collecting information on oral exposure to this substance for its health risk assessment at present.

Concerning inhalation exposure, the predicted maximum exposure concentration in the ambient air was 0.063 μg/m^3. The MOE of 190 was derived from the 'Non-toxic level' of 0.12 mg/m^3 divided by the predicted maximum concentration, and divided by 10, because the 'Non-toxic level' is established by means of animal testing. Accordingly, there would not be required at present further action for assessment of its health risk with regard to inhalation exposure to this substance in the ambient air.

Information of toxicity				Exposure assessment		Result of risk assessment			Judgment
Exposure path	Criteria for risk assessment	Animal	Criteria for diagnoses (endpoint)	Exposure medium	Predicted maximum exposure quantity and concentration				
oral	'Non toxic level' – mg/kg/day	–	–	Drinking water	– μg/kg/day	MOE	–	×	×
				Freshwater	0.14 μg/kg/day	MOE	–	×	
Inhalation	'Non toxic level' 0.12 mg/m^3	Rats	Loss of hair and drowsiness	Ambient air	0.063 μg/m^3	MOE	190	○	○
				Indoor air	– μg/m^3	MOE	–	×	×

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4. Initial assessment of ecological risk

With regard to acute toxicity, reliable information of a 72-hour EC_{50} growth inhibition value 2,510 μg/L was found for the algae *Pseudokirchneriella subcapitata*, a 48-hour EC_{50} immobilization value 97,260 μg/L was found for the crustacea *Daphnia magna* (water flea), and a 96-hour LC_{50} value exceeding 100,000 μg/L was found for the fish *Oryzias latipes* (medaka), and a 48-hour LC_{50} value of 220,000 μg/L was found for the *Xenopus laevis* (African clawed frog). Accordingly, an assessment factor of 100 was used, a predicted no effect concentration (PNEC) 25 μg/L was obtained based on the acute toxicity values. With regard to chronic toxicity, reliable information of a 72-hour no observed effect concentration (NOEC) growth inhibition value of 1,000 μg/L was found for the algae *P. subcapitata*, and a 21-day NOEC reproduction value of 850 μg/L was found for the crustacea *D. magna*. So an assessment factor of 100 was used, and a PNEC value 8.5 μg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value 8.5 μg/L obtained from the chronic toxicity for the crustacea was used.

The PEC/PNEC ratio was 0.4 for freshwater bodies and less than 0.02 for seawater bodies. Accordingly, efforts to gather information are thought to be needed. In this substance, there is thought to be need for the re-assessment after lowering the assessment factor by results from the chronic toxic test in the fish.

Hazard assessment (basis for PNEC)			Assessment factor	Predicted no effect concentration PNEC (μg/L)	Exposure assessment		PEC/ PNEC ratio	Result of assessment
Species	Acute / chronic	Endpoint			Water body	Predicted environmental concentration PEC (μg/L)		
Crustacea (water flea)	Chronic	NOEC reproduction inhibition	100	8.5	Freshwater	3.5	0.4	▲
					Seawater	< 0.17	< 0.02	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	Impossible of risk characterization. However, there is thought to be comparatively little need to collect information, etc.	×
	Inhalation exposure	Assessment with regard to the ambient air is thought to be unnecessary at this time.	○
Ecological risk	Requiring information collection. There is thought to be need for the re-assessment after lowering the assessment factor by results from the chronic toxic test in the fish.		▲

［Risk judgments］ ○: No need of further work ▲: Requiring information collection
■: Candidates for further work ×: Impossible of risk characterization

Non-toxic level *

・When a LOAEL is available, it is divided by 10 to obtain a level equivalent to NOAEL.

・When an adverse effect level for the short-term exposure is available, it is divided by 10 to obtain a level equivalent to an adverse effect level for the long-term exposure.