6	CAS No.: 156-60-5	Substance: Trans-1,2-dichloroethylene

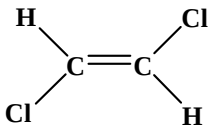
Chemical Substances Control Law Reference No.: 2-103 (as dichloroethylene)

PRTR Law Cabinet Order No.: 1-119

Molecular Formula: $C_2H_2Cl_2$

Molecular Weight: 96.94

Structural Formula:



1. General information

The aqueous solubility of this substance is 6.3 x 10^3 mg/L (25°C), and the partition coefficient (1-octonal / water) (log Kow) is 2.09. The vapor pressure is 331 mmHg (= 4.41 x 10^4 Pa) (25°C). The biodegradability of the substance is 0% by BOD degradation rate, and the accumulation factor is thought to be zero or very low.

This substance is a Type 2 Monitoring Chemical Substance under the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances and 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). In addition, it has been selected as an item requiring monitoring with regard to water pollution. Its primary use and release source is as a cleaning agent. Production and import quantities under the PRTR Law came to 10 tons.

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2. Exposure assessment

Total release to the environment in FY2003 under the PRTR Law came to 9.9 tons, all of which was reported. Release to the atmosphere accounted for a large part of the reported quantity. Chemical Industry accounted for large quantities of the reported release to the atmosphere. Plastic products accounted for large quantities of the reported release to public water bodies.

Release to the atmosphere accounted for a large part of the release to the environment. The distribution into each environmental medium as determined by means of a multimedia model was 96.7% for atmospheric and 3.2% for water bodies.

Based on data for ambient air, the predicted maximum exposure concentration for inhalation exposure to human beings was approximately 0.058 μg/m^3 (sum of cis- and trans-). The predicted maximum oral exposure was estimated at less than 0.16 μg/kg/day using data for drinking water, and at less than 0.92 μg/kg/day using data for groundwater. Moreover, as this substance is primarily distributed in the atmosphere, and distribution to water and bottom sediment, etc. are predicted to be minor, and as bioaccumulation is judged to be zero or very low, exposure from environmental media through the intake of food is thought to be low.

The predicted environmental concentration (PEC) that indicates exposure to aquatic organisms was estimated to be less than 5 μg/L for freshwater and less than 4 μg/L for seawater public water bodies.

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3. Initial assessment of health risk

Even brief exposure to this substance may result in irritation of the eyes, skin and respiratory tract. If inhaled, the substance may cause coughing, pharyngodynia, dizziness, nausea, drowsiness, a feeling of weariness and vomiting. If taken orally, the substance may cause abdominal pain in addition to the aforementioned symptoms. In addition, contact with the eyes may result in redness and pain, and contact with the skin may result in skin dryness. In high concentrations, the substance may affect the central nervous system, resulting in lowering of consciousness. When people were exposed for 10 minutes, a toxic concentration lowest (TCLo) of 4,800 mg/m^3 was reported.

There is insufficient information regarding the carcinogenicity of the substance, and it is not possible to make a

judgment as to whether it causes cancer in human beings. For this reason, an initial assessment of the substance was conducted based on information of non-carcinogenic effects.

As the 'Non-toxic level' was observed, used to estimate the margin of exposure (MOE), a no observed adverse effect level (NOAEL) of 17 mg/kg/day (increased ALP), obtained from mouse medium- and long-term toxicity testings, was obtained for oral exposure. As the test period was short, this value was divided by 10 to establish a value of 1.7 mg/kg/day. For inhalation exposure, a lowest observed adverse effect level (LOAEL) of 190 mg/m^3 was obtained by correcting the value of 790 mg/m^3 (liver fatty degeneration), obtained from rat medium- and long-term toxicity testings, to match the exposure circumstances. As the test period was short, this value was divided by 10 and, as it was a LOAEL value, it was divided by 10 again to establish a value of 1.9 mg/m^3.

With regard to oral exposure, the predicted maximum exposure when postulating intake of drinking water was estimated at less than 0.16 μg/kg/day. As the NOAEL of 1.7 mg/kg/day, etc. and the predicted maximum exposure were established by means of animal testing, the value was divided by 10 to derive an MOE that exceeded 1,100. Moreover, the predicted maximum exposure when postulating intake of groundwater was 0.92 μg/kg/day, and the MOE was 180. Furthermore, exposure originating in the environment due to the intake of food was estimated to be minor, and it is thought that adding this exposure would not greatly affect the MOE. Accordingly, assessment of the health risk from oral exposure to this substance is thought to be unnecessary at this time.

With regard to inhalation exposure, the predicted maximum exposure concentration in ambient air (sum of *cis*- and *trans*-) was estimated at 0.058 μg/m^3. The MOE derived in the same manner from the 'Non-toxic level' of 1.9 mg/m^3 and the predicted maximum exposure concentration exceeded 3,300. Accordingly, there is thought to be no need at this time for assessment of the health risk with regard to inhalation exposure to the substance in the ambient air.

Knowledge of toxicity				Exposure assessment		Result of risk assessment			Judgment
Exposure path	Guidelines for risk assessment	Animal	Impact assessment guideline (endpoint)	Exposure medium	Predicted maximum exposure quantity and concentration				
Oral	No observed adverse effect level 1.7 mg/kg/day	Mouse	ALP increase	Drinking water	< 0.16 μg/kg/day	MOE	> 1,100	○	○
				Groundwater	0.92 μg/kg/day	MOE	180	○	
Inhalation	No observed adverse effect level 1.9 mg/m^3	Rat	Liver fatty degeneration	Ambient air	0.58 μg/m^3	MOE	3,300	○	○
				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 48-hour LC_{50} value of 220,000 μg/L was found for the crustacea *Daphnia magna* (water flea), so an assessment factor of 1000 was used and a predicted no effect concentration (PNEC) of 220 μg/L was obtained based on the acute toxicity values. As no information regarding chronic toxicity could be obtained, a PNEC value of 220 μg/L for the substance was used.

The PEC/PNEC ratio was less than 0.02 for both freshwater bodies and seawater bodies. Accordingly, further work is thought to be unnecessary at this time.

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)		
Crustacean	Acute	LC50 Mortality	1,000	220	Freshwater	< 5	< 0.02	○
					Seawater	< 4	< 0.02	

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5. Conclusions

	Conclusions		Judgment
Health risk	Oral exposure	Assessment is thought to be unnecessary at this time.	○
	Inhalation exposure	Assessment with regard to the ambient air is thought to be unnecessary at this time.	○
Ecological risk	No need of further work.		○

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