

18	CAS No.: 79-00-5	Substance: 1,1,2-Trichloroethane
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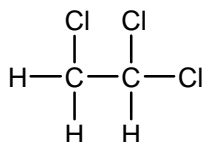
Chemical Substances Control Law Reference No.: 2-55(as trichloroethane)

PRTR Law Cabinet Order No.: 1-210

Structural Formula:

Molecular Formula: C₂H₃Cl₃

Molecular Weight: 133.42



1. General information

The aqueous solubility of this substance is 4.42×10^3 mg/L (25°C) and the partition coefficient (1-octanol / water) (log Kow) is 1.89. The vapor pressure is 23mmHg (= 3.1×10^3 Pa) (25°C). Degradability (aerobic degradation) in terms of GC-based degradation percentage is estimated to be 5%, and the bioconcentration of this substance is thought to be zero or very low. The half-life of this substance by hydrolyzation was 3.7-37 years (pH=8-7).

This substance is controlled under the Environmental Standards (quality of water, soil, groundwater) and under the target value for water quality management in tap water. It is also 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). It is used primarily as a raw material of Vinylidene Chloride. The quantity of production and import in FY2004 was 39,525 tons.

2. Exposure assessment

Total release to the environment in FY2004 under the PRTR Law came to 40 tons, all of which was reported. Release to the atmosphere accounted for a large part of the reported release. Chemical Industry accounted for high levels of release to both the atmosphere and public water bodies.

The distribution into each environment medium predicted by means of a multimedia model was 58.2% for water bodies and 41.3% for the atmosphere in the case of the region where the release quantity to the environment, atmosphere and public water bodies was considered to be the maximum.

The predicted maximum exposure concentration for inhalation exposure to human beings was approximately 0.02 µg/m³. For the indoor air, from the data of the limited area (Sendai city), there was a report that the expected maximum exposure concentration was below 0.030 µg/m³. The expected quantities of the maximum oral exposure were below 0.24µg/kg/day (calculated from the data of drinking water), and 2.7 µg/kg/day (calculated from the data of groundwater). Because the bioconcentration of this substance is 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 2.2 µg/L for freshwater and less than 1.3 µg/L for seawater public water bodies.

3. Initial assessment of health risk

This substance has effects on CNS, kidney and liver, and may cause depression of the CNS function, and impairment of liver and kidney. The exposure at high concentration may result in unconsciousness. The inhalation or ingestion may induce dizziness, drowsiness, headache, nausea, shortness of breath and unconsciousness. Contact with skin may cause a dry skin.

For this substance, the Environmental Standards have been set for water quality, groundwater and soil. Accordingly, it was excluded from the assessment for the oral exposure path.

For the inhalation, sufficient data of carcinogenesis were not obtained, and the non-toxic level could not be determined from the information of non-carcinogenic effects. Therefore, its health risk could not be identified. As a reference, estimated MOE on the basis of medium- and long-term toxicity testings in rats, guinea pigs and rabbits was 8,500 for the ambient air. For the indoor air, the nation-wide data of its concentration were not obtained. Accordingly, the MOE, estimated in the same way as for the ambient air by using the data of the limited areas, was exceeding 5,700. Accordingly, there would be relatively low necessity of collecting information on inhalation exposure to this substance for its health risk assessment at present.

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		MOE	-	×	
Inhalation	'Non toxic level' - mg/m ³	-	-	Ambient air	0.02	μg/m ³				MOE
				Indoor air	-	μg/m ³	MOE	-	×	×

4. Initial assessment of ecological risk

With regard to acute toxicity, reliable information of a 72-hour EC₅₀ growth inhibition value of 167,000 μg/L was found for the algae *Desmodesmus subspicatus*, a 48-hour EC₅₀ immobilization value of 81,000 μg/L was found for the crustacea *Daphnia magna* (water flea), and a 96-hour LC₅₀ value of 45,117 μg/L was found for the fish *Jordanella floridae* (cyprinodontiformes), and a 48-hour LC₅₀ value of 147,000 μg/L was found for the *Chironomus riparius* (*chironomus*). Accordingly, an assessment factor of 100 was used, a predicted no effect concentration (PNEC) of 450 μg/L was obtained based on the acute toxicity values. With regard to chronic toxicity, reliable information of a 28-day NOEC reproduction value of 26,000 μg/L was found for the crustacea *Daphnia magna* (water flea), a 32-day NOEC growth inhibition value of 6,000 μg/L was found for the fish *Pimephales promelas* (fathead minnow), and a 16-day NOEC morphology and hatching value of 10,000 μg/L was found for the other organism *Lymnaea stagnalis* (great pond snail) were obtained. So an assessment factor of 100 was used, and a PNEC value of 60 μg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value of 60 μg/L obtained from the chronic toxicity for the fish was used.

The PEC/PNEC ratio was 0.04 for freshwater bodies and less than 0.02 for seawater bodies. Accordingly, further work for both bodies 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)		
Fish (fathead minnow)	Chronic	NOEC growth inhibition	100	60	Freshwater	2.2	0.04	○
					Seawater	< 1.3	< 0.02	

5. Conclusions

	Conclusions		Judgment
Health risk	Inhalation exposure	Impossible of risk characterization. However, there is thought to be comparatively little need to collect information, etc.	×
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

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.