2CAS No.: 109-86-4Substance: Ethylene glycol monomethyl etherChemical Substances Control Law Reference No.: 2-405PRTR Law Cabinet Order No.: 1-45Molecular Formula:  $C_3H_8O_2$ Structural Formula:<br/> $H_3C-O-CH_2-CH_2-OH$ 

# 1. General information

The aqueous solubility of this substance is freely miscible, and the partition coefficient (1-octonal / water) (log Kow) is -0.61. The vapor pressure is 9.50 mmHg (=  $1.27 \times 10^3$  Pa) ( $25^{\circ}$ C). Biodegradability is judged to be good, but the substance is thought to be one that does not have hydrolyzable groups in the environment.

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 solvent in resins and special printing inks, as a solubilizing agent for removing dirt and stains in dry-cleaning, as an electrolyte in aluminum electrolytic capacitors, as a gasoline additive, as an aircraft antifreeze, and as a solvent used when manufacturing rubber, flame retardant agents and other chemical products. Domestic production in 2003 was estimated at 6,000 tons.

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### 2. Exposure assessment

Total release to the environment in FY2003 under the PRTR Law came to approximately 830 tons. Of this quantity, the amount reported came to approximately 810 tons. Most release to the atmosphere accounted for a large part of the reported release. Plastics Products and publishing, printing and allied industries accounted for high levels of release to the atmosphere. Chemical Industry reported high levels of release to public water bodies.

When estimated releases outside notification are included, release to the atmosphere accounted for the greatest quantity of release to the environment. The distribution into each environmental medium predicted by means of a multimedia model was 70.8% for water bodies and 20.8% for the atmosphere.

The predicted maximum exposure concentration for inhalation exposure to human beings was approximately 0.033  $\mu$ g/m<sup>3</sup>. The predicted maximum oral exposure could not be estimated. As distribution of this substance in the environment is expected to be primarily in water bodies, and because the log Kow is low at -0.61 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 not possible to establish.

## 3. Initial assessment of health risk

Even brief exposure to this substance may result in slight irritation of the eyes and respiratory tract. If inhaled, it may cause coughing, sore throat, dizziness, headache, nausea, vomiting and confusion. In high concentrations, it may even cause unconsciousness. If taken orally, it may cause abdominal pains and diarrhea. A leathal dose lowest (LDLo) for human beings of 3,380 mg/kg and a toxic dose lowest (TDLo) of 25 ppm (78 mg/m<sup>3</sup>) have been reported. There is insufficient knowledge regarding the carcinogenicity of the substance, and it is not possible to make a judgment as to whether it causes cancer in humans. 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 lowest observed adverse effect level (LOAEL) of 12 mg/kg/day (decline in fetal survival rate), obtained from monkey reproductive and developmental toxicity testings, was obtained for oral exposure. As this was a LOAEL value, it was divided by 10 to establish the value of 1.2 mg/kg/day. For inhalation exposure, a no observed adverse effect level (NOAEL) of 9

 $mg/m^3$  (delay in fetal ossification), obtained from rabbit reproductive and developmental toxicity testings, was established.

As oral exposure could not be determined, the health risk could not be assessed. However, degradability of the substance is good, and exposure via the food chain originating in the environment is estimated to be minor. Accordingly, there is thought to be little need to prioritize the determination of exposure to this substance.

With regard to inhalation exposure, the predicted maximum exposure concentration in ambient air was estimated at approximately  $0.033 \ \mu g/m^3$ . As the 'Non-toxic level' of 2.3 mg/m<sup>3</sup> and the predicted maximum exposure concentration were established by means of animal testing, the value was divided by 10 to derive an MOE of 7,000. 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							
	Exposure	Guidelir	nes for risk	Animal	Impact	Exposure	Predicted	maximum				
	path	path assessment			assessment	medium	exposure quantity and		Result of risk assessment			Judgment
					guideline		concer	ntration				
					(endpoint)							
	Oral	No observed	1.2 mg/kg/day	Monkey	Decline in fetal survival rate	Drinking water	_	$\mu$ g/kg/day	MOE	-	×	×
	Ulai	adverse effect level	1.2 mg/kg/day			Groundwater	_	$\mu$ g/kg/day	MOE	_	×	
	Inhalation	No observed	2.3 mg/m <sup>3</sup>	Rabbit	Delay in fetal ossification	Ambient air	0.033	$\mu$ g/m <sup>3</sup>	MOE	7,000	0	0
		adverse effect level	2.3 mg/m			Indoor air	_	$\mu$ g/m <sup>3</sup>	MOE	_	×	×

# 4. Initial assessment of ecological risk

With regard to acute toxicity, reliable information of a 72-hour  $EC_{50}$  growth inhibition value exceeding 100,000 µg/L was found for the algae *Pseudokirchneriella subcapitata*, a 48-hour  $EC_{50}$  immobilization value exceeding 84,800 µg/L was found for the crustacea *Daphnia magna* (water flea), and a 96-hour  $LC_{50}$  value exceeding 88,900 µg/L was found for the fish *Oryzias latipes* (medaka). Accordingly, an assessment factor of 100 was used, and a predicted no effect concentration (PNEC) exceeding 850 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 100,000 µg/L was found for the algae *P. subcapitata* and a 21-day NOEC reproduction value exceeding 92,200 µg/L was found for the crustacea *D. magna* Accordingly, an assessment factor of 100 was used, and a PNEC value exceeding 920 µg/L was obtained based on the chronic toxicity values. As the PNEC for the substance, a value exceeding 850 µg/L obtained from the acute toxicity for the crustacea was used.

At present, the ecological risk cannot be determined, as environmental concentrations sufficient for assessment have not been obtained. Nevertheless, there is thought to be little need to prioritize the determination of environmental concentrations of this substance.

Hazard	Hazard assessment (basis for PNEC)			Predicted no	Exposure	assessment			
Species	Acute / chronic	Endpoint	Assessment factor	effect concentration PNEC (µg/L)	Water body	Predicted environmental concentration PEC (µg/L)	PNC/PNC ratio	Result of assessment	
Crustacea	Acute	EC <sub>50</sub> immobilization	100	> 850	Freshwater	_	-	×	
Clusiacea	Acute		100	> 050	Seawater	—	—	^	

	Conclusions				
		Risk cannot be determined. However, there is thought to be			
Health risk	Oral exposure	little need to prioritize the determination of exposure to this	×		
		substance.			
	T 1 1 C	Assessment with regard to the ambient air is thought to be	0		
	Inhalation exposure	unnecessary at this time.			
Ecological risk	Impossible of risk characterization. However, there is thought to be little need to				
	prioritize the determination of environmental concentrations of this substance.				
[Risk judgments] O: No need of further work A: Requiring information collection					
	Candidates for f	further work $\times$ : Impossible of risk characterization			