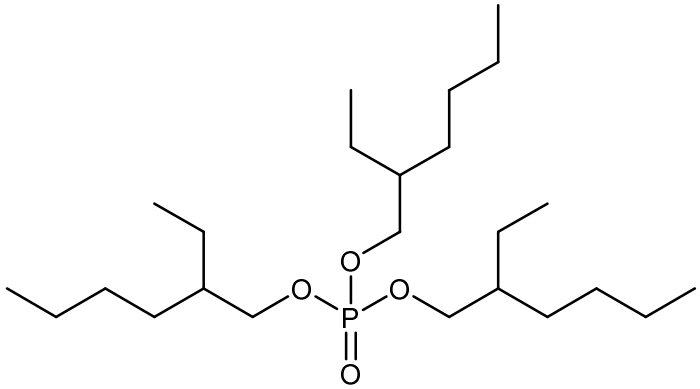
7	CAS No.: 78-42-2	Substance: Tris(2-ethylhexyl) phosphate

Chemical Substances Control Law Reference No.:
2-2000 (Trialkyl [C=1–20, or aryl butoxyethyl, glycerin, polyvinyl alcohol] phosphate ester), 2-2014 (Alkyl [or alkenyl, C=3–24] phosphate ester)

PRTR Law Cabinet Order No.*: 1-458
Molecular Formula: $C_{24}H_{51}O_4P$ Structural formula:
Molecular Weight: 434.63



*Note: No. in Revised Cabinet Order enacted on October 1, 2009

1. General information

The aqueous solubility of this substance is 0.600 mg/L (24°C), the partition coefficient (1-octanol/water) (log K_{ow}) is 4.23, and the vapor pressure is 8.25×10^{-8} mmHg (=1.10×10^{-5} Pa) (25°C). The biodegradability (aerobic degradation) is characterized by a BOD degradation rate of 0%, and bioaccumulation is thought to be nonexistent or low. Trimethyl phosphate's half-life for hydrolysis is 1.2 years (25°C, pH=7), while triethyl phosphate's half-life for hydrolysis is 5.5 years (25°C, pH=7).

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). The main use is as a plasticizer for electric cable sheathing, refrigeration appliances, shower curtains, raincoat fabric, PVC paste, and synthetic rubber. The production (shipments) and import quantity of trialkyl (C=1–20, or aryl butoxyethyl, glycerin, polyvinyl alcohol) phosphate ester in fiscal 2007 was 100 to <1,000 t/y. The production and import category under the PRTR Law was 1 t to <100 t.

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2. Exposure assessment

Because this substance was not classified as a Class 1 Designated Chemical Substance prior to revision of substances regulated by the PRTR Law, release and transfer quantities could not be obtained. Predictions of distribution by medium using a Mackay-type level III fugacity model indicated that if equal quantities were released to the atmosphere, water bodies, and soil, the proportions distributed to soil would be higher.

The predicted environmental concentration (PEC), which indicates exposure to aquatic organisms, was around 0.05 µg/L for public freshwater bodies and around 0.02 µg/L for seawater.

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3. Initial assessment of ecological risk

With regard to acute toxicity, the following reliable data were obtained: a 48-h EC_{50} of 130 µg/L for swimming inhibition in the crustacean *Daphnia magna* and a 96-h LC_{50} of more than 130 µg/L for the fish species *Pimephales promelas* (fathead minnow). Accordingly, based on these acute toxicity values and an assessment coefficient of 100, a

predicted no effect concentration (PNEC) of 1.3 μg/L was obtained.

With regard to chronic toxicity, reliable data of a 21-d NOEC of 1,000 μg/L was obtained for reproductive inhibition in the crustacean *D. magna*. Accordingly, based on this chronic toxicity value and an assessment coefficient of 100, a predicted no effect concentration (PNEC) of 10 μg/L was obtained. The value of 1.3 μg/L obtained from the acute toxicity to the crustacean was used as the PNEC for this substance.

The PEC/PNEC ratio was 0.04 for freshwater bodies and 0.02 for seawater. Accordingly, further work is thought to be unnecessary at this time.

Hazard assessment (basis for PNEC)			Assessment coefficient	Predicted no effect concentration PNEC (μg/L)	Exposure assessment		PEC/ PNEC ratio	Judgment based on PEC/PNEC ratio	Assessment result
Species	Acute/ chronic	End point			Water body	Predicted environmental concentration PEC (μg/L)			
Crustacean *Daphnia magna*	Acute	EC_{50} swimming inhibition	100	1.3	Freshwater	0.05	0.04	○	○
					seawater	0.02	0.02		

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4. Conclusions

	Conclusions	Judgment
Ecological risk	No need of further work at present	○

［Risk judgments］ ○: No need for further work ▲: Requiring information collection

■: Candidates for further work ×: Impossibility of risk characterization

（○）: Though a risk characterization cannot be determined, there would be little necessity of collecting information.

（▲）: Further information collection would be required for risk characterization.