

# Tris(2-ethylhexyl) phosphate (TEHP)

(CAS numbers: e.g. 78-42-2, EC number: 201-116-6

/ Entry number in HELCOM list of substances of concern: 21)

General sectors: Industry and commercial products

DRIVERS

ACTIVITIES

PRESSURES

STATE

IMPACTS

## Why a HELCOM concern?

### Main evidence

**S** Concentrations of Tris(2-ethylhexyl) phosphate exceed the applied threshold value in **15** of the 17 examined areas (assessment units) of the Baltic Sea. The threshold is exceeded in both coastal and off-shore areas (**1/2** assessed off-shore areas). In these 15 areas, on average **93%** of the assessable samples of **biota** (and/or sediment, where thresholds are exceeded more rarely) exceed the threshold value. This is based on a combination of monitoring data from the project LifeAPEX<sup>1</sup> and suspect screening data (thus corresponding to tentative identification) from the project PreEMPT<sup>2</sup>. A total number of 57 data points were possible to evaluate for this substance.

By further considering how much above or below the threshold each concentration is, and how often the substance is detected, Tris(2-ethylhexyl) phosphate scores **8.0/10** (confidence range: **6.9 – 8.4**) in the scale established when assessing the criticality/significance of current levels in the Baltic Sea pose, where 5 indicates concern and 10 extreme risk, and the range reflects the level of reliability and representativeness of concentrations and the thresholds.

The threshold values for Tris(2-ethylhexyl) phosphate, in biota and sediment, were acquired from the NORMAN Network ecotoxicology database<sup>3</sup>.

**I** Current levels in the Baltic Sea indicate potential negative impacts on pelagic biota and/or top predators such as mammals and birds and/or sediment-dwelling organisms.

### Supporting evidence

**P** Approximately **220-900 kg of Tris(2-ethylhexyl) phosphate** are estimated to enter the Baltic Sea every year via WWTPs (Undeman et al, 2022<sup>4</sup>). Additional inputs may be expected from riverine inputs beyond the contributing WWTP effluents. Given that the substance is **very toxic**<sup>5</sup>, current inputs are considered as likely significant, in terms of risk they pose for the Baltic Sea and its ecosystem services. As mentioned above, levels in Baltic Sea have already exceeded thresholds.

**I** Tris(2-ethylhexyl) phosphate is considered to have an **especially concerning mode of toxicity**. For example, it is an endocrine disruptor<sup>6</sup>. Endocrine disruptors mimic or interfere with hormones and can cause developmental abnormalities, reproductive dysfunction, and population effects.

### Overall assessment

When assessing current levels in the Baltic Sea, current inputs, and the severity of the relevant toxicity mechanism, Tris(2-ethylhexyl) phosphate scores **73-80/100** in the scale established for assessing the overall risk for impacts/threat for the Baltic Sea, where 50 indicates concern, 100 extreme risk, and the width of the span outlines the uncertainty in the assessment.

## Facts relevant for management considerations

### Causal chain and pathways

**A** The EU REACH registered volume for Tris(2-ethylhexyl) phosphate is 1,000 - 10,000 t/y<sup>7</sup>. Registered uses include consumer (photopaper, lubricants and greases in vehicles or machinery), professional (PUR, PPP products, lubricants and greases in vehicles or machinery including for use in open systems), and industrial uses (as a solvent in photochemicals, metal working fluids, in synthesis of hydrogen peroxide, lubricants and greases)<sup>8</sup>. According to ECHA's ARN<sup>9</sup>, the main technical function identified is as flame retardant and lubricating agent in a wide range of applications.

**S ?** *In order to further improve the evaluation of the risk, one possible aspect to consider is identity confirmation in PreEMPT samples – although it appears that its identity has been confirmed at least in LifeAPEX marine biota samples. A further aspect to consider is a review of the relevant toxicity thresholds (biota and secondary sediment).*

### Relevant policies (existing or planned measures)

**M (on A/P)** • Tris(2-ethylhexyl) phosphate is covered by two recent **Assessments for Regulatory Needs prepared by ECHA** (one on a group of chlorinated trialkyl phosphate flame retardants<sup>10</sup> – and one on regulatory strategy for flame retardants<sup>9</sup>). According to these reports, the substance is of known or potential hazard for endocrine disruption (both in terms of environment and human health), unlikely for PBT/vPvB, and eventual possible inclusion to SVHC list can be considered. Data generation for endocrine disrupting properties in the context of the REACH Regulation is ongoing.

## References:

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

[Note: Listing of detailed references will be provided in an upcoming update of the fact sheet – for a listing of the most common references among the different substances see the section at the end of the consolidated document which includes all the fact sheets]

<sup>1</sup>\* considering that there were also inconclusive non-detections (in terms of exceedance, due to a relatively high limit of detection), it is possible that the actual average frequency of exceedance in these areas is somewhat lower, but in any case >60%.