


# Human Health and Environmental Fact Sheet

**Disclaimer:** The information presented in this fact sheet was compiled from information from flame retardants manufacturers and public data sources. The authors cannot be held liable for factual errors. For latest information on substance testing, classification and labelling as well as regulatory status please contact the individual manufacturers and refer to their latest safety data sheet applicable in your country or region.

<b>Product name</b>	<b>Red Phosphorus</b>	
<b>Synonyms</b>	red phosphorus, Exolit RP	
<b>CAS no.</b>		
<b>Molecular Structure</b>		
<b>Mw</b>	ca	
<b>Mf</b>	P <sub>n</sub> polymeric form of elemental phosphorus	
<b>Physical form</b>	red / brown powder	
<b>Use</b>	<ul style="list-style-type: none"> <li>• flame retardant, main application is glass fibre reinforced polyamide, others include thermoset resins</li> </ul>	
<b>PBT/vPvB EVALUATION</b>		
	<b>Conclusion</b>	<b>Comments</b>
Persistent or very Persistent	Yes    No <b>X</b>	Since Red phosphorus is an amorphous polymeric form of elemental phosphorus, it is insoluble in water and organic solvents. However, slow disproportionating and oxidizing reactions produce traces of phosphine (strong smell, toxic), but mainly phosphorus acids (H <sub>3</sub> PO <sub>4</sub> , H <sub>3</sub> PO <sub>3</sub> , H <sub>3</sub> PO <sub>2</sub> ) as well as traces of unknown phosphorus compounds. These reaction products (particularly phosphine) are the cause of the toxic effects to organisms of red phosphorus. These reactions are promoted by high temperatures and moisture.
Bioaccumulative or very bioaccumulative	Yes    No <b>X</b>	not applicable, insoluble polymer
Ecotoxicity	Yes    No <b>X</b>	
<b>HUMAN HEALTH</b>		
	<b>Result</b>	<b>Comments</b>
<b>Acute toxicity</b>		
Acute toxicity (LD <sub>50</sub> )	LD <sub>50</sub> > 15 000 mg / kg (rat)	Test standard: proprietary, Klimisch 2
Eye irritation	Yes    No <b>X</b>	Test standard: rabbit, according to FDA-guideline 16 CFR 1500.42 91 26,142

Skin irritation	Yes	No	X	slightly irritating (rabbit), according to FDA 16 CFR 1500.41 91 26,141
Sensitization / Potentially allergenic	Yes	No		Test according to OECD 429 or OECD 406
Potentially mutagenic	Yes	No	X	Test according to OECD 471 (Ames)
<b>Chronic toxicity</b>				
Mutagenicity (NOAEL)	Yes	No	X	Test standard: OECD 473 (chromosome aberration and gene mutation assay in Chinese hamster cells)
Reprotoxicity (NOAEL)	Yes	No	X	because substance is not bio-accessible, not tested for
Genotoxicity	Yes	No	X	because substance is not bio-accessible, not tested for
Endocrine disruption	Yes	No	X	because substance is not bio-accessible, not tested for

<b>ENVIRONMENT</b>				
<b>Degradation</b>				
Half life in water (fresh or marine)			No data	Causes no biological oxygen consumption, therefore not suitable for standard test (OECD 301); slow disproportionating and oxidizing reactions to phosphorus acids and other species
Half life in sediment (fresh or marine)			No data	ditto
Half life in soil			No data	ditto
Readily biodegradable	Yes	No	X	ditto
Inherently biodegradable	Yes	No	X	ditto
Sewage treatment removal			98 %	adsorption to sewage sludge
<b>Bioaccumulation</b>				
BCF (log)			not applicable	insoluble polymer
Log K <sub>ow</sub>			not applicable	ditto
<b>Eco-toxicity</b>				
Toxicity for fish	LC <sub>50</sub> = 33 mg/L (96 h)			Species: Danio rerio Test standard: OECD 203
Toxicity for invertebrate	LC <sub>50</sub> = 10.5 mg/L (48 h)			Species: Daphina magna Test standard: OECD 202
Reprotox, invertebrate	not tested			Species: Daphina magna Test standard: OECD 211
Chronic toxicity for algae	EC <sub>50</sub> = 18.5 mg/L (72 h)			Species: Desmodesmus subspicatus Test standard: OECD 201
<b>Physical properties</b>				
Vapour pressure at 25 °C			not applicable	(inorganic) polymer
Solubility in water at 25 °C			< 1 mg/L	

Soil Adsorption coefficient, $K_{oc}$	no measured	Test standard:
Henry's law constant (atm-m <sup>3</sup> /mole)	not applicable, since no vapour pressure	Test standard
Hydrolysis (half life) in water		Test standard: OECD 111
<b>RISK PHRASES</b>		
	Applies following Directive EC/67/548	Comments
R40 Limited evidence of a carcinogenic effect	Yes No X	Not tested, because substance is not bio-accessible
R42 May cause sensitisation by inhalation	Yes No X	Not tested
R43 May cause sensitisation by skin contact	Yes No X	Not tested
R45 May cause cancer	Yes No X	Not tested, because substance is not bio-accessible
R49 May cause cancer by inhalation	Yes No X	Not tested
R50 Very toxic to aquatic organisms	Yes No X	Tested
R53 May cause long-term adverse effects in the aquatic environment	Yes X No	Tested

More information:

[www.exolit.com](http://www.exolit.com) (Clariant website)