Annex 2:

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Alternatives to brominated flame retardants

Screening for environmental and health data

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Extracts from summary pages 5 to7:

Table 2.1
Covered compounds and availability of environmental and health data. Poor, medium and good refers to a (subjective) assessment of the availability of data. It is not an evaluation of the quality of the data, nor whether sufficient data is available for a complete health and environmental assessment.

Trivial name	CAS no.	Physical-chemical	Health	Environment
Triphenyl Phosphate	115-86-6	Good	Good	Good
Tricresyl Phosphate	1330-78-5	Good	Poor (formulation data)	Poor (formulation data
Resorcinol bis(diphenylphosphate)	57583-54-7	Poor	Poor	Poor
Phosphonic acid (dimethyl ester)	20120-33-6	Poor	Poor	Poor
Aluminium Trihydroxide	21645-51-2	Medium	Poor (partly data on aluminium)	Poor (partly data on aluminium)
Magnesium Hydroxide	1309-42-8	Medium	Poor	Poor
Ammonium Polyphosphates	14728-39-9 and 68333-79-9	Poor	Poor	Poor (formulation data)
Red Phosphorus	7723-14-0	Medium	Medium (different allotropic forms)	Medium (different allotropic forms)
Zinc Borate	1332-07-6	Poor	Poor (data for boric acid and zinc)	Poor (data for sodium borate and zinc)
Melamine	108-78-1	Good	Medium	Medium
Antimontrioxide	1309-64-4	Good	Good	Good
Quinidincarbonate	Not available	Poor	Poor	Poor (data from quinidine sulphate)

Triphenyl and tricresyl phosphates, resorcinol	The available data indicate that the triphenyl and tricresyl phosphates may have low impact on health, but are quite toxic in the environment. Poor data availability for the structurally related resorcinol prohibits conclusions regarding the effect pattern.
Phosphonic acid (dimethyl ester)	For this compound only very few data was identified. The phosphonic acid (dimethyl ester) appears acutely toxic at 13 mg/kg bodyweight in rats and mutagenic effects has been reported. A formulation of the compound was lethal to fish (LC_{50}) at approx. 1 ml/l (density unknown).
Aluminium trihydroxide, magnesium hydroxide	The data sets on these compounds are relatively limited. It appears that limited toxic effects can be induced in mammals after exposure to high doses. Aluminium trihydroxide is generally not toxic in the available tests. Both metal-ions play a metabolic role in mammals, but the data for the metal-ions indicates acute toxic levels for Al to fish and crustaceans at <1-10 mg/l and approx. 65 mg/l for crustaceans exposed to Mg.
Red phosphorus	Red phosphorus data are limited and conclusions are unclear. The yellow phosphorus is reportedly acutely toxic to humans (fatal dose 1 mg/kg), but the red allotropic form is described as less toxic. Acute toxic concentrations (LC_{50} or EC_{50}) of unspecified allotropic form in the aquatic environment occurs at 0.009 – 0.012 mg/l for fish and crustaceans.
Zinc borate	There is practically no data on the compound. Based on comparison with sodium borate and boric acid the possible main effects in humans are expected to be irritation of skin, eyes and throat, and harm to the unborn child. In the environment zinc-ion is very toxic to crustaceans.
Melamine	Melamine seems to be only mildly toxic when ingested by animals. The available data does not show evidence of cancer induction by melamine. One experiment indicates that melamine may be harmful to crustaceans, but otherwise the reviewed toxicity data show little aquatic toxicity. The bioaccumulation of this compound is presumably low in the natural pH range (pH 6-8). The available biodegradation data indicates that this compound is persistent both under aerobic and anaerobic conditions.
Antimony trioxide	Antimony trioxide is in the EU classified as "Harmful (Xn)" and must be labelled with the risk-phrase "Possible risk of irreversible effects" (R40) due to possible carcinogenicity. The substance is reported as teratogenic. The effects in ecotoxicological test are primarily on algae (ranging from very toxic to harmful), but toxicity in crustaceans or fish is very low.
Quinidine carbonate	No data was identified on quinidine carbonate for health or environmental properties. The toxicity of quinidine carbonate estimated from the toxicity of quinidine sulfate indicates that quinidine carbonate could be harmful to crustaceans, but not to fish.