



POPs Recycling Contaminates Children's Toys with Toxic Flame Retardants

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Executive summary

Recycling plastics containing toxic flame retardant chemicals found in electronic waste results in contamination of new plastic children's toys and related products. The substances include octabromodiphenyl ether (OctaBDE), decabromodiphenyl ether (DecaBDE), and hexabromocyclododecane (HBCD). This study found all three toxic chemicals in recycled plastic children's products. In a survey of products from 26 countries, 90% of the samples contained OctaBDE and/or DecaBDE. Nearly half of them (43%) contained HBCD. Recycling materials that contain persistent organic pollutants (POPs) and other toxic substances contaminates new products, continues human and environmental exposure, and undermines the credibility of recycling.

OctaBDE and DecaBDE are widely used in electrical equipment and are primary toxic components of electronic waste (e-waste). HBCD is primarily used in polystyrene building insulation but is also found in electronic equipment. Both HBCD and OctaBDE are listed in the Stockholm Convention for global elimination. DecaBDE is recommended for listing in the treaty for elimination and governments will make the decision at the 8th Conference of the Parties (COP8) in April 2017. Note that OctaBDE is subject to an exemption that permits recycling of materials containing the substance. The treaty's expert committee has warned against this practice and COP8 will decide whether to continue it. The expert committee explicitly recommended to, *"...eliminate brominated diphenyl ethers from the recycling streams as swiftly as possible" noting that, "Failure to do so will inevitably result in wider human and environmental contamination and the dispersal of brominated diphenyl ethers into matrices from which recovery is not technically or economically feasible and in the loss of the long-term credibility of recycling."* (Stockholm Convention 2011)

The Stockholm Convention contains hazardous waste limits known as "low POPs content" levels that define the value at which wastes are considered to be POPs wastes and therefore must be addressed according to strict treaty obligations. The final limits for listed substances such as OctaBDE¹ and HBCD will be decided at COP8. The limit for DecaBDE will be decided later if listed. This study found samples of children's products exceeding proposed and existing hazardous waste limits. For example, 43 samples (39%) contained OctaBDE at levels greater than 50 ppm – one of the proposed hazardous waste limits. One sample exceeded the higher proposed limit of 1000 ppm. For HBCD, 7 samples (7%) contained HBCD at concentrations higher than 100 ppm – one of the proposed hazardous waste limits. Two samples exceeded the higher proposed level of 1000 ppm. Finally, 48 samples (43%) contained DecaBDE at levels that exceeded the current hazardous waste limit for PCBs, which they strongly resemble in structure and adverse effects. The data illustrates the importance of protective hazardous waste limits since weak standards could encourage toxic recycling and waste dumping in the absence of national regulations prohibiting the practices.

Two Stockholm Convention measures that could help address toxic recycling are: 1) to end the current recycling exemptions and avoid new ones including in the listing decision on DecaBDE; and 2) set protective limits for substances in wastes so that they are subjected to treaty obligations for destruction. Sustainable waste management and a circular economy are not compatible with toxic chemicals being recycled into new consumer products.

¹ HexaBDE and HeptaBDE