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# TOXIC LOOPHOLE

Executive  
summary

Recycling Hazardous Waste  
into New Products

Arnika 2018

**Arnika Association** is a Czech non-governmental organization established in 2001. Its mission is to protect nature and a healthy environment for future generations both at home and abroad. Since its beginnings, Arnika has worked on protection of consumers from chemically hazardous products. Lately, Arnika has been conducting its own research focusing on toxic chemicals in consumer products, mainly toys and child care products. Arnika serves as the Regional Hub for Central and Eastern Europe for IPEN.  
[www.arnika.org](http://www.arnika.org)

**The Health and Environment Alliance (HEAL)** is the leading not-for-profit organisation addressing how the environment affects human health in the European Union (EU) and beyond. HEAL works to shape laws and policies that promote planetary and human health and protect those most affected by pollution, and raise awareness on the benefits of environmental action for health. HEAL's EU Transparency Register Number: 00723343929-96

[www.env-health.org](http://www.env-health.org)

Established in 1998, **International POPs Elimination Network (IPEN)** is currently comprised of over 500 Participating Organizations in 116 countries, primarily developing and transition countries. IPEN brings together leading environmental and public health groups around the world to establish and implement safe chemicals policies and practices that protect human health and the environment. IPEN's mission is a toxics-free future for all. IPEN's EU Transparency Register Number: 157269723532-97

[www.ipen.org](http://www.ipen.org)



## EXECUTIVE SUMMARY

This report found that consumer products, including toys, made from recycled electronic waste are contaminated with toxic chemicals. Product testing by Arnika, HEAL, IPEN and 17 other European organisations showed items on sale in Europe contained flame retardant chemicals, which are found in electronic waste and are restricted on health and environmental grounds. The report calls for closure of the loophole in EU legislation that allows products made from recycled waste to contain these contaminants. It outlines the changes in EU and international policy that would allow proper implementation of the Stockholm Convention to protect health and the environment by setting strict limit values for defining waste as being hazardous (POPs waste) and disallowing it there for export and toxic recycling.

### The study

Between April and June 2018, 430 plastic items including toys, hair accessories, kitchen utensils and other consumer products were purchased in stores and markets in both European Union Member States (Austria, Belgium, Czechia, Denmark, France, Germany, Netherlands, Poland, Portugal, Spain, and Sweden) and surrounding Central and Eastern European countries (Albania, Armenia, Belarus, Bosnia and Herzegovina, Macedonia, Montenegro, Russia,

and Serbia). All items were screened with a handheld XRF analyser showing that 109 samples (25%) had an elevated level of bromine and antimony indicating recycled plastic, most likely from e-waste.

E-waste contains bromine compounds that are used as flame retardants in electronic equipment. The compounds include polybrominated diphenyl ethers or PBDEs, such as OctaBDE and DecaBDE. These two substances are of primary interest in this study because, although highly hazardous to health

and the environment, they are permitted in consumer items made from recycled waste materials in the European Union.

All countries providing samples for the study are required to eliminate PBDEs from production and use. OctaBDE and DecaBDE and HBCD are listed in the Stockholm Convention on Persistent Organic Pollutants, a Convention which aims to eliminate or restrict the production and use of persistent organic pollutants (POPs). Only the European

Union, and 5 other countries around the globe have allowed recycling exemptions.

In order to support its toxic recycling policy, EU also uses and promotes higher limits for PBDEs and HBCD classification of material as POPs waste. So called Low POPs Content levels determine if material is classified as POPs waste and shall be decontaminated. Only low enough POPs content limits can ensure separation of hazardous waste from the recycling stream. A protective low POPs content limit will also prevent contaminated waste from being exported from developed countries to Asian and African developing countries where environmentally sound waste disposable practices are quite rare.

## Results

Of the original samples collected, 109 items were identified as likely to be containing flame retardants originating in recycled e-waste. **More detailed chemical analysis revealed that:**

- 94 samples (86%) contained OctaBDE at concentrations ranging from 1 to 161 ppm
- 50 sample (46%) exceeded the limit for OctaBDE concentrations of 10 ppm (EU Regulation on POPs for products that are made of new rather than recycled plastics)
- 100 samples (92%) contained DecaBDE at concentrations ranging from 1 to 3310 ppm
- The highest measured concentrations of PBDEs were found in children's

toys, followed by hair accessories and kitchen utensils. A toy guitar from Portugal had the highest concentration of PBDEs (3318 ppm or 0.3% of product weight).

## Health risks

Among the adverse impacts of PBDEs, endocrine disruption is a particular public health concern. PBDEs are known to disrupt human thyroid function affecting the developing brain and causing long-term neurological damage. Research shows PBDE exposure to be associated with poorer attention in children as well as hyperactivity.

Contamination of children's toys is especially worrying because children often put things in their mouths. It is unacceptable that toys, which are supposed to develop children's motor skills and intellectual capacity, such as plastic puzzles and Rubik's cubes, also expose them to toxic chemicals that have the very opposite, neurotoxic effects.

Food can be contaminated because PBDEs and HBCD can easily migrate from cooking items. PBDEs and HBCD in any product containing recycled plastics adds to all existing exposure paths, including via household dust.

## Implications

The results indicate that toxic flame retardant chemicals are passed from e-waste into recycled consumer products on sale in the European Union and Central and Eastern European markets.

Ironically, if the products analysed in this study were made of virgin plastics instead of recycled materials, almost half (50 samples) would not meet the EU Regulation on POPs (OctaBDE concentrations must not exceed the regulatory limit of 10 ppm). These different standards for PBDE content in virgin and recycled articles result from weak legislative thresholds for POPs waste and recycling exemptions in the Stockholm Convention listing of PentaBDE and OctaBDE. The legislative loopholes are motivated by recycling targets that ignore the consequences of contaminating new products during recycling, which continues the legacy of PBDE emissions and exposures.

The case of PBDEs illustrates an inconsistency in legislation on chemicals, products, and waste in the European Union. The study also reveals that consumer products made from recycled waste and containing toxic chemicals are not only on sale in the EU Member States, which make use of recycling exemptions for PBDEs, but are also on the market in Central and Eastern Europe. EU recycling goals are globalised through the international conventions – that means that hazardous e-waste is finding its way across state boundaries via recycling workshops back into recycled products. This loophole, hidden from public view, is threatening the health and lives of children, consumers, workers employed in recycling workshops and nearby residents as well as other vulnerable groups.

# POLICY RECOMMENDATIONS

To close the toxic loophole,  
the following seven policy interventions are essential.

## 1. WITHDRAW THE RECYCLING EXEMPTIONS FOR MATERIALS THAT CONTAIN PentaBDE AND OctaBDE UNDER THE STOCKHOLM CONVENTION AND IN THE EU POPS REGULATION

During the Stockholm Convention, COP9, in 2019 the EU should withdraw its registration for the PentaBDE and OctaBDE recycling exemptions and encourage the small number of other Parties registered for those exemptions to do the same. The EU POPs regulation should be modified accordingly. This is an essential step to prevent contamination of new products with PBDEs and a key measure to achieve a truly circular economy, which must be non-toxic for the environment and for human health.

## 2. STOP UNDERMINING THE GLOBAL ELIMINATION AIMS OF THE STOCKHOLM CONVENTION IN THE EU

As the principle objective of the Stockholm Convention is to protect human health and the environment from POPs, the European Parliament should adopt a more protective standard of 10 ppm for DecaBDE content in articles made of recycled materials.

## 3. SET ENVIRONMENT- AND HEALTH-PROTECTIVE LIMITS FOR POPS WASTES UNDER THE BASEL CONVENTION AND EU POPS REGULATION

The EU should take the initiative to advocate for lowering the currently proposed hazardous waste limit of 1000 ppm for PBDEs and for HBCD to the scientifically and environmentally sound limits. These would be 50 ppm for PBDEs and 100 ppm for HBCD in the Basel and Stockholm Conventions and the EU POPs regulation. Only this low POPs content limit can help ensure separation of hazardous waste from the recycling stream. Protective low POPs content limits will also prevent waste export and waste disposal options, which cannot be considered environmentally sound.

# 4.

## STOP E-WASTE EXPORT FROM EUROPE TO DEVELOPING AND TRANSITION COUNTRIES UNDER BASEL CONVENTION PROVISIONS

E-waste must be clearly designated as hazardous. The EU should support modifications to the Basel Convention e-waste guidelines to prevent e-waste export to countries that lack regulatory infrastructure and technical and economic capacities for hazardous waste management.

# 5.

## STREAMLINE RESTRICTIONS FOR POPS, AVOID REGRETTABLE SUBSTITUTES, AND SPEED UP THE AUTHORISATION PROCESS UNDER THE REACH REGULATION

The entire group of halogenated flame retardants should be restricted under the REACH legislation to avoid replacement of PBDEs and other halogenated substances with regrettable substitutes. No exemptions, derogations, or transitional periods for restrictions or authorisations should be given for recycled materials or spare parts containing POPs.

# 6.

## IMPLEMENT SEPARATION TECHNIQUES TO REMOVE TOXIC CHEMICALS FROM WASTES AND NON-COMBUSTION TECHNOLOGIES FOR POPS DESTRUCTION

Until products are produced without toxic substances, separation techniques should be used to remove PBDEs and other toxic substances before recycling. The EU should implement non-combustion techniques for the destruction of POPs and advocate for their adoption in relevant Stockholm and Basel Convention working groups.

# 7.

## PUBLISH THE PROMISED NON-TOXIC ENVIRONMENT STRATEGY TO GUARANTEE A TRULY NON-TOXIC CIRCULAR ECONOMY AND BENEFITS FOR ENVIRONMENT AND HEALTH

To deliver on its commitment under the Seventh Environment Action Programme and progress on creating a circular economy, the EU in 2018 should publish a strategy for moving towards a non-toxic environment, including a clear commitment to keep chemicals of concern (e.g. flame retardants and other endocrine disruptors among others) out of products from the start due to their harmful impacts on vulnerable populations, such as infants, small children and pregnant women.

## Ranges of PBDE concentration (ppm) in recycled plastic items compared to EU legislative thresholds

	Country	Number of samples	OctaBDE	DecaBDE	Sum of PBDEs
Measured ranges of concentrations (ppm)	Albania	4	2-57	34-1048	36-1105
	Armenia	4	4-36	28-594	33-630
	Austria	6	9-46	101-458	147-482
	Belarus	6	0-62	0-1533	0-1595
	Belgium	4	3-17	26-660	28-677
	Bosnia and Herzegovina	5	2-70	55-779	57-849
	Czechia	13	<LOQ-62	<LOQ-652	<LOQ-675
	Denmark	6	1-7	2-71	4-78
	France	6	1-34	2-1043	3-1077
	Germany	10	<LOQ-69	<LOQ-442	<LOQ-511
	Macedonia	5	4-27	80-770	84-790
	Montenegro	3	1-35	16-1770	17-1805
	Netherlands	3	0-25	<LOQ-569	0-593
	Poland	7	1-36	6-624	8-660
	Portugal	5	3-161	21-3310	25-3318
	Russia	5	6-65	14-534	37-574
	Serbia	5	7-119	89-1494	96-1550
	Spain	6	4-50	152-898	171-948
	Sweden	6	<LOQ-0	<LOQ-8	<LOQ-8
Legislative thresholds (ppm)	EU POPs Regulation: Articles		10	Not set yet	
	EU POPs Regulation: Recycled products		1000	Not set yet	
	Low POPs Content in Wastes for Stockholm Convention		50 or 1000	Not set yet	
	EU RoHS: Electronics			1000	

LOQ=limit of quantification

# POPS RECYCLING CONTAMINATES CHILDREN'S TOYS

Recycling e-waste that contains toxic flame retardants contaminates new products, continues exposure, and undermines the credibility of recycling.

## CHILDREN

Brominated flame retardants are distributed from recycled e-waste plastics into children's toys. These chemicals are known to disrupt human hormone systems, adversely impacting the development of the nervous system and children's intelligence.

## TOXIC PRODUCTS IN OUR HOMES



## FAMILIES

OctaBDE, DecaBDE, and HBCD have been used as flame retardants in a variety of electronic products for many years. These chemicals were recognized as POPs of global concern that need to be eliminated just like other POPs listed in the Stockholm Convention.



## WORKERS

E-waste recycling is spreading poisons in insecure recycling sites and exposed workers' bodies.

## LOW INCOME COUNTRIES

E-waste is often trafficked to low and middle income countries that do not have capacities to deal with them.

**The POPs Treaty needs to stop recycling exemptions and establish strict hazardous waste limits to discontinue use and global distribution of POPs.**



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