

REACH focus on PAH's content in articles

Polycyclic aromatic hydrocarbons (PAH's) are a large group of organic compounds with two or more fused aromatic (benzene) rings. Low-molecular-weight PAH's (two and three rings) occur in the atmosphere predominantly in the vapour phase, whereas multi-ringed PAH's (five rings or more) are largely bound to particles. Intermediate-molecular-weight PAH's (four rings) are partitioned between the vapour and particulate phases, depending on the atmospheric temperature.

There are approximately 150 different known PAH's in air, soil, foodstuffs, and water, and articles coming into close contact with humans. **Benzo[a]pyrene (B[a]P) is often used as a marker for total exposure to carcinogenic PAH's, as the contribution of B[a]P to the total carcinogenic potential is high.**

PAH's are widespread environmental pollutants as well as it is very hazardous to human health: carcinogenic, mutagenic and harmful for reproductive system.

PAH's exist in a wide range of petrochemical products such as plastic, rubber, crude oil, lubricant, rustproof oil, form release agents, mineral oil and tar, and in daily chemicals such as pesticides, charcoal, germicides and mosquito-repellent incense.

Humans are exposed to PAH's through several routes, namely inhalation of air and re-suspended soil and dust, consumption of food and water, and dermal contact: it is easily absorbed through the skin.

In order to protect the health of humans from risk arising from exposure to PAH's in articles, during last 10 years EU legislation developed towards better control on PAH's exposure on humans. It is done by setting lower limits on PAH's content in wide range of articles coming into close contact with humans.

Below is the development of legislation concerning use of PAH's in articles for general public:

2007: PAH's are banned for the sale to the general public as substance on their own or in mixtures by entry 28 of Annex XVII to REACH Regulation, and entry 50 of the same Annex restricts the presence of PAH's in extender oils used for the manufacture of tyres.

2013 : The Toy Safety Directive (TSD) has restricted PAH's use to 100 mg/kg (0.01%) based on the harmonized classification of these PAH'S's as 1B carcinogenic, mutagenic and reprotoxic (CMR).

2015: The Commission Regulation (EU) No 1272/2013 published in official journal of European Union on 07 Dec 2013, amended Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as regards Polycyclic Aromatic Hydrocarbons (PAH's) applied **new restrictions for 8 PAH's and lower limits** than the previous TSD restriction.

According to the Regulation No 1272/2013, articles with direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity, made of plastic and rubber shall

not contain more than 1 mg/kg (0.0001 % by weight of this component) of any of the listed PAH's.

Such articles include amongst others:

- Sport equipment such as bicycles, golf clubs, racquets
- Household utensils, trolleys, walking frames
- Tools for domestic use
- Clothing, footwear, gloves and sportswear
- Watch-straps, wrist-bands, masks, head-bands
- Toys, including activity toys, and childcare articles, shall not contain more than 0.5 mg/kg (0.00005 % by weight of this component) of any of the listed PAH's.

The eight restricted PAH'S's are shown in the table below.

<i>Substance</i>	<i>CAS No</i>	<i>CMR</i>	REACH Annex XVII Limits		
			<i>TSD Limits</i>	<i>General articles</i>	<i>Toys and childcare items</i>
			<i>mg/kg, %</i>	<i>mg/kg, %</i>	<i>mg/kg, %</i>
Benzo[<i>a</i>]pyrene	50-32-8	Carc 1B	100 (0.01%)	1 (0.0001%)	0.5 (0.00005%)
Benzo[<i>e</i>]pyrene	192-97-2		1000 (0.1%)		
Benzo[<i>a</i>]anthracene	56-55-3		1000 (0.1%)		
Chrysen(CHR)	218-01-9		1000 (0.1%)		
Benzo[<i>b</i>]fluoranthene	205-99-2		1000 (0.1%)		
Benzo[<i>j</i>]fluoranthene	205-82-3		1000 (0.1%)		
Benzo[<i>k</i>]fluoranthene	207-08-9		1000 (0.1%)		
Dibenzo[<i>a,h</i>]fluoranthene	53-70-3		100 (0.01%)		

According to Annex XVII REACH, by 27 December 2017, European Commission shall review the limit values of PAH's in articles and toys in the light of new scientific information.

Been the main Regulation for chemicals in Europe, it can be expected that REACH will most likely be focused on control of PAH's content in articles contacting with human and environment.