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Presence of Polycyclic Aromatic Hydrocarbons (PAH) Cabot Carbon Black Products ¹⁾

As a member of the International Carbon Black Association (ICBA), Cabot Corporation, would like to provide the following response to your inquiry regarding the presence of Polycyclic Aromatic Hydrocarbons (PAHs) in carbon black product(s).

The ICBA is a scientific association with the purpose of sponsoring, conducting, and participating in investigations, research, and analyses relating to the health, safety, and environmental aspects of the production and use of carbon black.

Carbon Black is an inorganic industrial chemical produced in quantities of more than 9 million tons per year worldwide and used in a large number of industrial articles (tyres, rubber and plastic products, printing inks and coatings). It is used as reinforcing filler, UV stabiliser, conductive additive and pigment for colouring purposes.

Industrially manufactured carbon black is produced by pyrolysis of hydrocarbons at high temperatures under controlled process conditions. This results in the formation of unavoidable trace levels of organic impurities, such as PAHs. These impurities are firmly bound to the carbon black surface under normal handling and use.

Investigations at the University of Düsseldorf demonstrated that PAHs adsorbed onto the carbon black surface are not “bioavailable” ²⁾. The purpose of the study was to determine if body fluids would leach PAHs from the carbon black surface, where the PAHs could interact with tissue. The study found that the PAHs were not leached by artificial lung fluid from the carbon black surface.

Another recent study performed at Münster Analytical Solutions demonstrated that PAHs coming from carbon black, once incorporated into a rubber matrix, were not migrating to aqueous simulants representing typical human or environmental liquids like sweat, saliva or rainwater ³⁾.

Those PAHs can only be extracted from the surface of the carbon black itself by strong organic solvents under vigorous laboratory conditions at elevated temperatures. Generally, this is performed through Soxhlet extraction by toluene. Please note that these extraction conditions are **not** at all representative of normal industrial processing or environmental

conditions. Based on laboratory analyses, most carbon black grades will typically have PAH levels not exceeding 0.1%. This level is, for instance, complying with the requirements of the REACH-Regulation (EC No. 1907/2006, Annex XVII) relating to the *restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles*. It should also be noted that carbon black is not classified as a dangerous substance by the European Directive 67/548/EEC and its amendments, and subsequently CLP-Regulation (EC) No. 1272/2008.

When evaluating exposure to carbon black, note that in the various products and finished articles containing carbon black in a wide range of loadings, the carbon black itself is not readily available, nor is it exposed to the outside environment. The carbon black is embedded and firmly bound into a polymeric matrix (e.g. rubber, plastics, coatings, ink, etc.). As a result, the carbon black itself cannot migrate out of the products or finished articles, thus reducing the probability of exposure to PAHs.

In consideration of all this, the risks to human health associated with the presence of PAHs originating from the carbon black in the final products or finished articles is extremely low.

This information is being provided as of the date hereof. Please refer to Cabot's website—www.cabot-corp.com - for any updates to this information.

1. *Cabot Corporation's carbon black products include all BLACK PEARLS®, ELFTEX®, MOGUL®, MONARCH®, REGAL®, SPHERON®, STERLING®, VULCAN®, UNITED®, MACHEM®, SHOBLACK®, CSX™, CRX™, and IRX™ grades.*

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2. *Borm, PF., Cakmak, G., Jermann, E., Weishaupt, C., Kempers, P., van Schooten, FJ., Oberdorster, G., Schins, RP. Formation of PAH-DNA adducts after in vivo and vitro exposure of rats and lung cells to different commercial carbon black. Toxicol. Appl. Pharmacol., 2005 June, 1:205(2):157-67.*
3. *Hamm, S., Frey, T., Weinand, R., Moninot, G., Petiniot, N. Investigations on the extraction and migration behavior of polycyclic aromatic hydrocarbons (PAHs) from cured rubber formulations containing carbon black as reinforcing agent. Rubber Chemistry & Technology, Volume 82 (2009), Issue 2.*

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