Chemical Information Document
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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Other Names	Polyaromatic hydrocarbons PAHs

CAS Number	Substance
83-32-9	Acenaphtene
208-96-8	Acenaphthylene
120-12-7	Anthracene
List continued in "Additional Information"	

May Be Found In

- Rubber & plastic components
- Footwear outsoles
- Lacquers and coatings
- Recycled materials
- Carbon black pigments/dyestuff
- Extender oils/softeners
- Lubricants
- Printing pastes
- Dye dispersing agents (Naphthalene)
- Textiles (Naphthalene)

Polycyclic Aromatic Hydrocarbons (PAHs) are naturally occurring substances composed of multiple carbon and hydrogen aromatic rings. They are found in fossil fuels and are often formed during incomplete combustion of organic materials.[1] PAHs have a characteristic smell similar to that of car tires or asphalt. PAHs are typically present in final products as impurities and are not intentionally added.

Uses in the Supply Chain

Oil residues containing PAHs are added to rubber and plastics as a softener or extender and may be found in rubber, plastics, lacquers, and coatings. PAHs are often found in the outsoles of footwear and in printing pastes for screen prints. PAHs can be present as impurities in carbon black dyestuffs. They also may be formed from thermal decomposition of recycled materials during reprocessing. Naphthalene is often present as an impurity from low-quality raw materials used as intermediates in the production of textile dye dispersing agents and may be found in textiles.[1]

Why PAHs are Restricted

- Legislation in major markets around the world restricts the presence of PAHs in final products.
- Some PAHs can be very toxic to aquatic organisms and, above certain exposure levels, may cause long-term adverse effects in the aquatic environment.
- Above certain levels, long-term exposure to some PAHs may result in the development of particular cancers.
- Some PAHs, above certain exposure levels, may impair human fertility or cause harm to unborn children.
- Inhalation of PAHs in the air can irritate eyes and the respiratory tract.[1,2]
- Chemical hazard information for many chemicals can be found at the following external databases:
  - GESTIS Substance Database: Here (external link)
  - US National Library of Medicine: Here (external link)
  - USA EPA Occupational Chemical Database: Here (external link)

Sourcing Compliant Materials from Your Suppliers

- Contact your suppliers and explain that you require their manufactured materials to be compliant with the current AFIRM RSL limits.[3]
- Require suppliers to submit a confirmation of material compliance or a test report from a third-party laboratory.
- When materials are received, consider performing risk-based testing to ensure the current AFIRM RSL limits are met.
- Share this information sheet with your material suppliers so they have full visibility and understand your

sourcing requirements.
- Pay special attention to rubber and plastic materials used in footwear outsoles, as well as rubber and plastic components, as they widely use extender oils that may contain or degrade to PAH substances.
- Recycled plastic and rubber materials may be at greater risk of containing PAHs due to thermal decomposition during reprocessing.
- Materials colored black may incorporate carbon black-based pigments or dyestuffs. Carbon black may contain high concentrations of PAHs as impurities if not of suitable quality.
- Naphthalene may be found in textile materials because it is a residual impurity in dye dispersing agents composed of naphthalene-sulfonic acid polycondensation products.
- Advise your material suppliers to adjust the time and temperature used to process plastic and rubber materials to minimize the risk of PAH formation from thermal decomposition.
- Lubricants used in textile processing may be contaminated with PAHs and can result in materials failing to meet PAH limits.

Sourcing Compliant Formulations from Your Chemical Suppliers

- For all formulations, request SDS documentation that meets current GHS requirements.
- Contact your suppliers and explain that you require formulations to be compliant with the current ZDHC MRSL limit whenever applicable.[4]
- Discuss with your chemical supplier whether any safer alternatives are available that are suitable substitutes for your production needs.
- Pay special attention to suppliers of oils used as extenders or softeners in plastic and rubber materials. Recycled oils can carry the greatest risk of PAH contamination.
- Consider that carbon black based pigments and dyestuffs may contain high residual concentrations of PAHs.
- Dispersing agents for textile dyes may contain high residual naphthalene concentrations if they are based on low-quality naphthalene-sulfonic acid polycondensation products.
- Recycled or low-quality lubricants used for textile processing may contain PAHs.

Safer Alternatives

PAHs are impurities in low-grade raw materials, and safer alternatives are those materials or formulations that are of sufficient quality and do not contain PAH substances. Due diligence should be used in sourcing raw materials that are not contaminated with PAHs.

Additional Information

Visit ECHA's Candidate List of substances of very high concern to view dossiers for many restricted substances https://echa.europa.eu/candidate-list-table

Continued list of CAS numbers and substance names from first page:

CAS Number	Substance
191-24-2	Benzo(g,h,i)perylene
86-73-7	Fluorene
206-44-0	Fluoranthene
193-39-5	Indeno(1,2,3-cd)pyrene
91-20-3	Naphthalene
85.01-8	Phenanthrene
129-00-0	Pyrene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene

192-97-2	Benzo[e]pyrene
205-82-3	Benzo[j]fluoranthene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene

References

[1] Center for Disease Control and Prevention. (2016, December 23). Factsheet: Polycyclic Aromatic Hydrocarbons (PAHs). Retrieved April 4, 2017, from https://www.cdc.gov/biomonitoring/PAHs_FactSheet.html

[2] Agency for Toxic Substances & Disease Registry. (2014, August 28). ToxFAQs for Polycyclic Aromatic Hydrocarbons (PAHs). Retrieved April 4, 2017, from https://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=121&tid=25

[3] Apparel and Footwear International RSL Management Group (Ed.). (2018, January 31). Restricted Substances List (RSL). Retrieved http://afirm-group.com/afirm-rsl/

[4] Manufacturing Restricted Substances List (Publication). (2015, December). Retrieved http://www.roadmaptozero.com/programme/manufacturing-restricted-substances-list-mrsl-conformity-guidance/