

Appendix D. Matrix of Asphalt Category Data.

SIDS Category / Endpoints	CAS 8052-42-4	CAS 64741-56-6	CAS 64742-07-0	CAS 64742-16-1	CAS 64742-85-4	CAS 64742-93-4	Read Across Range to Untested Category Members
	Asphalt	Residues (petroleum), vacuum	Raffinates (petroleum), residual oil decarbonization	Petroleum resins	Residues (petroleum), hydro-desulfurized vacuum	Asphalt, oxidized	
Physical-Chemical Endpoints							
Melting Point (Softening Point (°C))	30 – 60 [hard grade] 60 – 75 [penetration grade]	The range of values selected for read across to untested members reflects the minimum and maximum softening point values from these ranges.				60 – 130	30 – 130
Boiling Point (°C)	Asphalt and vacuum residue are obtained as the residues from the vacuum distillation of crude oil. CONCAWE (2001) reported a typical boiling range of >450 °C.					>450	
Vapor Pressure (hPa)	Substances in the asphalt category are semi-solid materials, boil at temperatures >450, and have negligible vapor pressure at ambient temperatures (CONCAWE, 2001). Some constituents may have the opportunity to escape the solid matrix when heated during roofing and paving applications.					negligible Vapor Pressure	
Partition Coefficient	Estimated partition coefficient values for representative hydrocarbon structures in asphalt are >10. These constituents will not have measurable partition coefficients using standardized testing methods.					Partition Coefficient not measurable	
Water Solubility (mg/L)	Substances in the asphalt and vacuum residue category consist of hydrocarbons having 25 or more carbon atoms and molecular weights of 500 to 15000. At room temperature, these substances exist as semi-solid to solid materials and as such they are expected to have extremely low water solubility (CONCAWE 1992, 2001).					negligible water solubility	
Environmental Fate Endpoints							
Photodegradation, OH ⁻ reaction T _{1/2} (days)	Estimated half-lives of representative hydrocarbon structures covering the range of molecular weights known to predominate in asphalts ranged from 0.1 to 0.4 days. Half-lives of specific polyaromatic hydrocarbons were estimated to be 0.2 to 1.2 days.					0.1 – 1.2	
Stability in Water	Materials in the Asphalts HPV Category are not subject to hydrolysis.					Stable	
Environ. Distribution	At ambient temperatures these substances exist as semi-solid to solid materials having negligible vapor pressure and water solubility. These physical/chemical features limit their distribution in the environment.					Negligible	
Biodegradation classification	Hydrocarbon components in asphalt are capable of being biodegraded, but under realistic exposure conditions, where the bulk properties of asphalt limit dispersion and the available surface area for microbial attack, biodegradation is expected to be minimal.					Not readily biodegradable	

Ecotoxicology Endpoints							
Acute Fish LL50 (mg/L WAF loading rate)	Substances in the asphalt category are not expected to cause acute or chronic toxicity to aquatic organisms due to the extremely low water solubility of these materials. Evidence for a lack of aquatic toxicity has been demonstrated in testing of Lubricating Base Oils and Aromatic Extracts (LL0 values = 1000 mg/L). These two petroleum substances have similar classes of hydrocarbon constituents (i.e., saturate and aromatic fractions) and contain molecules having carbon numbers within a range of C15 – C50. Constituents in asphalts have typical carbon numbers >C25.						>1000
Acute Daphnia EL50 (mg/L WAF loading rate)							>1000
Algae EL50 (mg/L WAF loading rate)							>1000
Health Effects Endpoints							
Acute		Oral rat LD50 > 5.0 g/kg Dermal Rabbit LD50 > 2.0 g/kg				Fume Inhalation rat LC 50 > 182 mg/m ³	Oral > 5.0 g/kg Dermal > 2.0 g/kg Inhalation > 182 mg/m ³
Repeated-Dose (mg/m ³)	Nose only Inhalation rat 90 days: paving fume condensate LOAEL = 149.17 NOAEL = 28.17	Dermal rabbit, NOAEL > 1000 mg/kg				Nose only Inhalation rat 28 days: roofing fume condensate LOAEL males = 297.3 LOAEL female = 100.1 NOAEL males = 100.1 NOAEL female = 30.0	Inhalation LOAEL = 149 to 297 mg/m ³ NOAEL = 28.2 to 30.0 mg/m ³
Genotoxicity, <i>in vitro</i> Gene mutation	Negative ⁻¹	Weak positive – mammalian cell				Negative ⁻²	Negative – weak positive
Genotoxicity, <i>in vivo</i> Cytogenetics		Oral – Negative				Inhalation – Negative	Negative
Reproductive toxicity Inhalation (mg/m ³)						Roofing fume condensate NOAEL = 297.3 [max dose]	NOAEL = 297.3 mg/m ³

Developmental toxicity						Roofing fume condensate NOAEL = 297.3 [max dose]	NOAEL = 297.3 mg/m ³
Carcinogenicity: Inhalation (mg/m ³)						Paving fume condensate NOAEL = 100 [max dose]	Negative
Dermal (mouse skin painting)		Weak positive				Weak positive ⁻³ Positive ⁻⁴	

Blank cells = no data; value will be read across range

¹ Whole asphalt diluted/extracted with and without activation

² Fumes generated under field conditions; High temperature generated fumes (316⁰C) positive with activation

³ Fumes generated under field conditions

⁴ Laboratory generated fumes (316⁰C)