Update Dec 2016; changed annual use frequency reporting format, revised to conform to Concawe 4/14 report

CONCAWE_SCED_24_1_a_v2: Lubricants, liquids, filling vehicle engine

Products/activities covered by the SCED:
Filling passenger vehicle engine outdoors with lubricant
Applicability of the SCED (depending on substances properties):
SCED data refers to the lubricating base oils (refined or synthetic)

Exposure Descriptor or Determinant	Value
SCED characteristics	
Name of the SCEDs	Lubricants, liquids, filling vehicle engine
PC/AC descriptor	PC24
SCED code	CONCAWE_SCED_24_1_a_v2
Code of other related SCED	
Author	CONCAWE
Source of SCED	http://www.concawe.org
Physical form of the product	Liquids
User characteristics	
Adult/child assumed	Covers adult use
Common parameters	
Concentration of substance in mixture (g/g)	1
Explanations	>99% of formulated product is the substance
Frequency of use over a day (event/day)	1
Rationale	Unchanged from ECETOC TRA default value
Frequency of use over a year (times/year)	4
Rationale	4 times/year; consistent with the average top up frequency for a car of once/5.7 months and the 90th percentile of once/month.
Dermal Specific Parameters	
Exposure via dermal route	Yes
Rationale	
Skin Contact Area	Inside of 2 hands
Rationale	Based on EPA estimates and the observed findings in simulation studies
Dermal transfer factor	0.001
Rationale	Based on measured data from controlled simulations indicating <0.001% of product is transferred to the skin.
Inhalation Specific Parameters	
Exposure via inhalation route	Yes
Rationale	
Spray application?	No
Amount of Product used per application (g/event)	870
Rationale	Changing 1 L, density of 868 g/L
Exposure Time per event (hr)	0.17
Rationale	About 10 min, 75th percentile value

Exposure Descriptor or Determinant	Value
Inhalation transfer factor	0.01
Rationale	Estimated loss of <0.01 product used via spillage or evaporation. Based on cited data in safety data sheets, the evaporation rate is very low at 25 ^{o}C.
Place of use	Outdoor
Oral Specific Parameters	
Exposure via oral route	Oral exposure assumed to be negligible
Rationale	Direct oral contact will only arise from intentional ingestion. Indirect exposure may occur from incidental contact with contaminated surfaces but is not considered a significant exposure source.
Volume swallowed (cm3)	N/a
Rationale	
Oral transfer Factor	N/a
Rationale	

CONCAWE_SCED_24_1_a_v2: Supporting Explanation

Consumers can be exposed to lubricant base oils through inhalation from vapour (evaporation or displacement) or dermal contact from spillage when they are maintaining their vehicle engine. Direct oral contact will only arise from intentional ingestion. The Concawe SCEDs reflect the true nature of consumer exposures and both contain specific changes to the TRA defaults to better represent the scenario in reality e.g. the increase of the product ingredient from ECETOC TRA defaults; the change in location from indoors to an outdoor scenario.

Exposure Descriptor or Determinant	Value	Rationale
Product Characteristics		
Volatility		Typically <7 Pa at 20 ^{o}C (source products SDSs)
Product Ingredient Fraction (by weight)	1	Increased above ECETOC TRA default (0.5) for lubricants, greases, and release products – liquids [1]
Frequency of Use (events/day), value <1 indicates infrequent (less than daily) use *	0.011	4 times/year [2]; consistent with the 90th percentile of the top up frequency of once/month (=0.03) and the average top up frequency of once/5.7 months (=0.006) [3]. It is less than TRA default use frequency for lubricant: daily [1].
Dermal Specific Parameters		
Skin Contact Area (cm^2)	480	Surface area of face of 2 hands (equivalent to palm of 2 hands or both face and dorsal surfaces of one hand). Consistent with 468 cm^2 = 7.8 cm^2/kg, adjusted to 60 kg [2]. It is less than TRA default (two hands): 857.5 cm^2 [1] and significantly greater than the value of c. 50 cm^2 identified from simulated studies [6].
Dermal Transfer Factor**	0.001	Based on measured data from controlled simulations indicating <0.001% of product is transferred to the skin [6] and consistent with the value estimated (0.003) for a dermal scenario while changing the oil in a car in US EPA E-FAST (based on the film thickness of 0.0119 cm and surface area of 2 hands (480 cm^2), i.e. the amount contact with skin is estimated to be 5 g) [2]. Estimated based on low volatility and direct contact with contaminated surfaces and incidental drips from pouring activity. The skin transfer factor should not be confused with the nature of any subsequent dermal absorption of the substance [8], which can be expected to be very low [7].
Inhalation Specific Parameters		
Amount of Product used per application (g)	870	Estimated changing one litre, density of 868 g/L. Top up amount 1.25 L (90th percentiles) and 0.7 L (average) [3]. It is less than TRA default: 5000 g [1].
Exposure Time (hr)	0.17	About 10 min, 75th percentile value [4]. It is less than TRA default: 4 hr [1]. These estimates have been shown to be conservative in consumer simulations of the use [6].
Is product used outdoors only?	No	Garage
Room Volume (m^3)	34	A default room size for a garage in RIVM general factsheet [5]. It is greater than TRA default: 20 m^3 [1].

Exposure Descriptor or Determinant	Value	Rationale
Ventilation specified or likely due to properties (e.g. odour, etc.)- if so what type – (open window, fan)	1.5	A default ventilation rate for a garage based on RIVM general factsheet [5].
Inhalation factor (fraction of total amount handled lost to air)	0.01	Estimated loss of <0.01 product used via spillage or evaporation. This is a more conservative estimate than the auto-refuelling with gas oils value (0.002) due to less contained transfer. Also, based on its MSDS, the evaporation rate approximates zero at 25 ^{o}C.

* A frequency of <1 is used for chronic exposure assessments. Exposure for the day of use would still be based upon a value of 1 or greater (if the default suggests multiple uses occur in a single day).

****** Dermal transfer factor (DTF) represents the % of total amount handled that is transferred to the skin. If this factor is being applied in a tool with an algorithm that uses skin surface area and the thickness of the layer to calculate dermal loading, such as ECETOC TRA v3, the DTF would need to be adjusted so that the final dermal loading remains the same as when the DTF is applied to the total amount.

References:

1. ECETOC (2014) ECETOC Targeted Risk Assessment (TRA) Tool, version3.1. Brussels: European Centre for Ecotoxicology and Toxicology of Chemicals (available at: http://www.ecetoc.org/tra)

2. US EPA (2007) Exposure and fate Assessment screening tool (E-FAST). Washington DC: US Environmental Protection Agency. Available at: http://www.epa.gov/oppt/exposure/pubs/efastdl.htm

3. CONCAWE (2014) Use of motor fuels and lubricants: habits and practices of consumers in Europe. Report No. 4/14. Brussels: CONCAWE

4. US EPA (2011) Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F. Washington DC: US Environmental Protection Agency

5. Bremmer, H. et al (2006) Limiting conditions and reliability, ventilation, room size, body surface area. General fact sheet. Updated version for ConsExpo 4. RIVM report 320104002. Bilthoven: National Institute for Public Health and the Environment

6. Galea K. et al (2013) Determination of the potential for dermal exposure from transfer of lubricants and fuels by consumers. IOM report TM/13/03. Edinburgh: Institute of Occupational Medicine. (available at http://www.iom-world.org/media/106928/iom_tm1303.pdf)

7. Sartorelli, P. et al (1999) Dermal exposure assessment of polycyclic aromatic hydrocarbons: in vitro percutaneous penetration from lubricating oil. *Int Arch Occup Environ Health 72, 528-532*

8. Frasch, H.F. et al (2014) Analysis of finite dose dermal absorption data: Implications for dermal exposure assessment. *Journal of Exposure Science and Environmental Epidemiology 24, 65–73*