Update Dec 2016; changed annual use frequency reporting format

CONCAWE_SCED_13_5_a_v2: Fuels, Liquid, Home space heater

Products/activities covered by the SCED:
Filling space heater indoors with fuel every day during heating season
Applicability of the SCED (depending on substances properties):
Determinant values refer to kerosene as the fuel

Exposure Descriptor or Determinant	Value
SCED characteristics	
Name of the SCEDs	*Fuels, Liquid: Home space heater*
PC/AC descriptor	PC13
SCED code	CONCAWE_SCED_13_5_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)	180
Rationale	Daily use during heating season (6 months)
Dermal Specific Parameters	
Exposure via dermal route	Yes
Rationale	
Skin Contact Area	Palm of one hand
Rationale	Palm of only one hand expected to hold the fuel container when refuelling
Dermal transfer factor	0.001
Rationale	Estimated value. This value is greater (more conservative) than the <0.001% of material handled that has been measured as being transferred onto the skin when refuelling cars.
Inhalation Specific Parameters	
Exposure via inhalation route	Yes
Rationale	
Spray application?	No
Amount of Product used per application (g/event)	3320

Exposure Descriptor or Determinant	Value
Rationale	Based on 4L and a density of 830 g/L (tank size of a home space heater is about 5L and the heater with a full tank of the fuel can last for 12-15hr.
Exposure Time per event (hr)	0.033
Rationale	Estimated 2 min as it should take significantly less time to refuel a smaller size tank than auto-refuelling (3 min)
Inhalation transfer factor	0.02
Rationale	It is reasonable to anticipate that only a low amount (c. 5 mL) is likely to be routinely spilled during pouring in a residence and this equates to a comparative evaporative loss of <0.02 based on equivalent gasoline values for scooters (for scooter refuelling, the emission loss is calculated to be ~0.001 for refuelling spillage and 0.002 for vapour displacement emission based on the scooter tank volume of 5 L).
Place of use	Indoor
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_13_5_a_v2: Supporting Explanation

Consumers can be exposed to kerosene and other home heating fuels through inhalation from vapour evaporation; vapour displacement from the fuel tank of the heating appliance; or dermal contact from spillage when they are refuelling their home space heaters. The basis for the SCED values (when compared to the TRA defaults) that better represent the scenario in reality are listed below.

Exposure Descriptor or Determinant	Value	Rationale
Product Characteristics		
Volatility		Typically <133 Pa at 20 ^{o}C (source products SDSs)
Product Ingredient Fraction (by weight)	1	Increased above ECETOC TRA default (0.5) for fuel – liquids [1]
Frequency of Use (events/day), value <1 indicates infrequent (less than daily) use *	1.00	TRA default for fuel [1]
Dermal Specific Parameters		
Skin Contact Area (cm^2)	210	Palm of one hand as only one hand holds the refuelling container. This is lower than the TRA default of 857.5cm^2 [1].
Dermal Transfer Factor**	0.001	Estimated value. This value is greater (more conservative) than the <0.001% of material handled that has been measured as being transferred onto the skin when refuelling cars [12] and the 75th percentile of 0.00005 for hand contamination during pouring from a pesticide container [2].
Inhalation Specific Parameters		
Amount of Product used per application (g)	3320	Based on 4 litres and a density of 830 g/L (tank size of a home space heater is about 5L and the heater with a full tank of the fuel can last for 12-15hr [3]). This is lower than the TRA default of 5000 g [1].
Exposure Time (hr)	0.03	Estimated 2 min as it should take less time to refuel a smaller size tank than auto-refuelling. In the auto-refuelling, the exposure time (3 min) was set to be greater than the 97th percentile value for refuelling time [4], which is generally consistent with reported refuelling time ranging from 0.3-3.5 min, with an average of 1min [5] and self-recall survey estimates based upon 2 min ranges indicating refuelling time 7 min (90th percentiles) and 4 min (average) [6]. Typical pouring practices suggest values lower than the TRA default of 4hr [1].
Is product used outdoors only?	Yes	
Room Volume (m^3)	20	TRA default for an indoor room [1]
Ventilation specified or likely due to properties (e.g. odour, etc.)- if so what type – (open window, fan)	0.6	TRA default [1] for an indoor room without ventilation.
Inhalation transfer factor (fraction of total amount handled lost to air)	0.02	Expect low amount (5 mL max or 0.001) spilled during pouring in a residence, evaporative loss expected to be <0.02 based on equivalent gasoline values for scooters. For scooter refuelling, 10x the

Exposure Descriptor or Determinant	Value	Rationale
		gasoline value was used as a conservative estimate due to less contained transfer. The emission loss is calculated to be ~0.001 for refuelling spillage and 0.002 for vapour displacement emission based on the scooter tank volume of 5L when using fuel pump [7]. For auto refuelling, evaporative losses during refuelling are expected to be <0.002: measured emissions of 4 – 10.4g VOC emitted per gallon of gasoline during vehicle refuelling converts to an inhalation factor of 0.001 – 0.004 for automobiles without vapour recovery systems [8] and applying the recovery system default value of 98% efficiency [9] to this data gives an estimated emission of 0.0001-0.0003 weight fraction; loss from refuelling without vapour recovery system was <0.002 at 25 ˚C [10]; refuelling loss of about 0.0027 was indicated in another reference [11].

* 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:

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