

Update Dec 2016; changed annual use frequency reporting format

CONCAWE_SCED_13_2_a_v2: Fuels, Gas, Automotive Refuelling

Products/activities covered by the SCED:

Filling motor vehicle outdoors with a full tank of fuel every week

Applicability of the SCED (depending on substances properties):

Determinant values refer to LPG as the fuel

Exposure Descriptor or Determinant	Value
SCED characteristics	
Name of the SCEDs	<i>Fuels, Gas: Automotive Refuelling</i>
PC/AC descriptor	PC13
SCED code	CONCAWE_SCED_13_2_a_v2
Code of other related SCED	CONCAWE_SCED_13_1_a_v2 CONCAWE_SCED_13_3_a_v2
Author	CONCAWE
Source of SCED	http://www.concawe.org
Physical form of the product	Gas
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)	52
Rationale	Once/week; consistent with the 90 th percentile of 5 times per month (0.17) and average of 3.1 times per month (0.1).
Dermal Specific Parameters	
Exposure via dermal route	No
Rationale	Substance is a gas. If dermal contact occurs then it will result in cold burns.
Skin Contact Area	N/a
Rationale	
Dermal transfer factor	N/a
Rationale	
Inhalation Specific Parameters	
Exposure via inhalation route	Yes
Rationale	
Spray application?	No
Amount of Product used per application (g/event)	43000

Exposure Descriptor or Determinant	Value
Rationale	Based LPG vehicle tank filled with 80 L LPG and LPG density of 533 g/L
Exposure Time per event (hr)	0.05
Rationale	Consistent with reported refuelling time ranging from 0.3-3.5 min, with an average of 1 min.
Inhalation transfer factor	0.0005
Rationale	LPG refuelling is via a contained self-sealing nozzle due to flammability considerations. Hence, leakage on nozzle insertion and withdrawal is very low.
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 of the product which is not conceivable.
Volume swallowed (cm3)	N/a
Rationale	
Oral transfer Factor	N/a
Rationale	

CONCAWE_SCED_13_2_a_v2: Supporting Explanation

Self-service customers can be exposed to LPG through inhalation from vapour evaporation when they are refuelling their cars or similar vehicles. Dermal exposure is not likely to be significant given restrictive dispensing conditions due to flammability considerations. Specific changes to the TRA defaults to better represent the scenario in reality while maintaining a conservative exposure prediction included the increase of the product ingredient and use amount from ECETOC TRA defaults, and assumptions of weekly fuelling of a full tank in an indoor location designed to be conservative for an outdoor scenario.

Exposure Descriptor or Determinant	Value	Rationale
Product Characteristics		
Volatility		Typically >133000 Pa at 20 °C (source product SDSs)
Product Ingredient Fraction (by weight)	1	Increased above ECETOC TRA default (0.5) for fuel [1]
Frequency of Use (events/day), value <1 indicates infrequent (less than daily) use *	0.14	Once/week; consistent with the 90 th percentile of 5 times per month (0.17) and average of 3.1 times per month (0.1) in a recent survey [2]. These data suggest lower values than the TRA default of 1 (daily refuelling) [1]
Dermal Specific Parameters		
Skin Contact Area (cm ²)	N/a	Substance is a gas. If dermal contact occurs then it will result in cold burns.
Dermal Transfer Factor**	N/a	
Inhalation Specific Parameters		
Amount of Product used per application (g)	43000	Based on 100 L LPG vehicle tank filled with 80 L LPG to allow 20% expansion. LPG density of 533 g/L (tank size ranges from 46 L to 95 L, generally <100 L [3]). This is an increase over the TRA default of 5000 g [1]
Exposure Time (hr)	0.05	Set it to be greater than the 97 th percentile value for refuelling time [5]. Generally consistent with reported refuelling time ranging from 0.3-3.5 min, with an average of 1min [4] and self-recall survey estimates based upon 2 min ranges indicating refuelling time 7 min (90 th percentiles) and 4 min (average) [2]. These observations indicate a value lower than the TRA default of 4 hr [1].
Is product used outdoors only?	Yes	Service station
Room Volume (m ³)	100	100 m ³ used as a conservative default volume for an outdoors scenario (consistent with Stoffenmanager ®) [6]. The TRA default is 20 m ³ [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.

Exposure Descriptor or Determinant	Value	Rationale
Inhalation transfer factor (fraction of total amount handled lost to air)	0.0005	LPG refuelling is via a contained self-sealing nozzle due to flammability considerations. Hence, leakage on nozzle insertion and withdrawal is very low. The factor utilized is intended to be conservative, and is greater than that estimated from US Federal Transit Administration [7] emission limits of 0.15 g/gallon of LPG dispensed (<0.0001).

* 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. CONCAWE (2014) Use of motor fuels and lubricants: habits and practices of consumers in Europe. Report No. 4/14. Brussels: CONCAWE
3. LPG tank size for vehicle in Europe. Available at: <http://www.tinleytech.co.uk/sizes.html>
4. Vainiotalo, S. et al (1999) Customer exposure to MTBE, TAME, C6 Alkyl methyl ethers, and benzene during gasoline refueling. *Environ Health Perspect* 107, 2, 133-140
5. Hakkola, M.A. and Saarinen, L.H. (2000) Customer exposure to gasoline vapors during refueling at service stations. *Applied Occupational and Environmental Hygiene* 15, 677-680
6. Stoffenmanager 5.5. A web-based exposure estimation tool. Available at: <https://www.stoffenmanager.nl/Default.aspx>
7. Jenks C.W. (1998) Technology assessment of refueling-connection devices for CNG, LNG, and Propane: Transportation Research Board, National Research Council. Washington DC: Transit Cooperative Research Program