*Update Dec 2016; changed annual use frequency reporting format*

## CONCAWE_SCED_13_7_a_v2: Fuels, Liquids, Recreational vehicles

**Products/activities covered by the SCED:**
Filling tank of recreational vehicle with fuel every week outdoors
**Applicability of the SCED (depending on substances properties):**
Determinant values refer to gasoline as the fuel

| Exposure Descriptor or Determinant | Value |
|---|---|
| **SCED characteristics** | |
| **Name of the SCEDs** | *Fuels, Liquids, Recreational vehicles* |
| **PC/AC descriptor** | PC13 |
| **SCED code** | CONCAWE_SCED_13_7_a_v2 |
| **Code of other related SCED** | |
| **Author** | CONCAWE |
| **Source of SCED** | http://www.concawe.org |
| **Physical form of the product** | Liquid |
| **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 |
| **Dermal Specific Parameters** | |
| **Exposure via dermal route** | Yes |
| **Rationale** | |
| **Skin Contact Area** | 210 $cm^2$ |
| **Rationale** | Palm of only one hand exposed during re-fuelling |
| **Dermal transfer factor** | 0.01 |
| **Rationale** | Estimated value. This value is much greater (more conservative) than the <0.001% of material handled that has been measured as being transferred onto the skin when refuelling a car with diesel fuel. |
| **Inhalation Specific Parameters** | |
| **Exposure via inhalation route** | Yes |
| **Rationale** | |
| **Spray application?** | No |
| **Amount of Product used per application (g/event)** | 7500 |
| **Rationale** | Based on a typical 10 L fill volume |
| **Exposure Time per event (hr)** | 0.017 |
| **Rationale** | Estimated 1 min due to small volume being transferred. TRA default time is 4 hr [1]. |
| **Inhalation transfer factor** | 0.01 |

| Exposure Descriptor or Determinant | Value |
|---|---|
| **Rationale** | Assumed to be equivalent to the value applied for general gasoline transfers. |
| **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. Significant indirect contact is unlikely due to volatility of substance. |
| **Volume swallowed ($cm^3$)** | N/a |
| **Rationale** | |
| **Oral transfer Factor** | N/a |
| **Rationale** | |

**CONCAWE_SCED_13_7_a_v2: Supporting Explanation**

Users of recreational vehicles (such as quad bikes or ATVs) can be exposed to gasoline through inhalation from vapour evaporation/displacement or dermal contact from spillage when they are refuelling their quad bikes or similar vehicles. 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 from ECETOC TRA defaults and assumptions of weekly fuelling a full tank in a location designed to be conservative for an outdoor scenario.

| Exposure Descriptor or Determinant | Value | Rationale |
|---|---|---|
| **Product Characteristics** | | |
| **Volatility (Pa)** | >69000 | at 20 $^{o}$C (source product's 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 *** | 0.14 | Once/week, estimated as similar to consumer auto vehicle refuel with gasoline. For auto refuelling, a 90$^{th}$ percentile of 5 times per month (0.17) and average of 3.1 times per month (0.1) was reported [2]. These data suggest lower values than the TRA default of 1 (daily refuelling) [1]. |
| **Dermal Specific Parameters** | | |
| **Skin Contact Area (cm$^2$)** | 210 | Palm of one hand as only one hand holds fuel container or nozzle. TRA default is 857.5 cm$^2$ [1]. |
| **Dermal Transfer Factor**** | 0.01 | This value is greater (more conservative) than the factor of 0.002 that is applied when refuelling a car with gasoline at the pump but reflects that refuelling is invariably from a petrol can and hence is less controlled. This should be contrasted with the 75th percentile of 0.00005 for hand contamination during pouring from a pesticide container [4].The skin transfer factor should not be confused with the nature of any subsequent dermal absorption of the substance [9], which can be expected to be very low [10]. |
| **Inhalation Specific Parameters** | | |
| **Amount of Product used per application (g)** | 7500 | Based on 10 L fill volume and density of 750 g/L (ATV tank size is typically ~15 L [3]). The use amount has been increased from the TRA default of 5000 g [1]. |
| **Exposure Time (hr)** | 0.03 | Estimated as 2 min as it should take less time to refuel a smaller size tank than for car auto-refuelling. In the auto-refuelling, the exposure time (3 min) was set to be greater than the 97$^{th}$ 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 mins ranges indicating refuelling time 7 min (90$^{th}$ percentiles) and 4 min (average) [2]. These observations indicate values substantially lower than the TRA default of 4hr [1]. |
| **Is product used outdoors only?** | Yes | |

| Exposure Descriptor or Determinant | Value | Rationale |
|---|---|---|
| **Room Volume ($m^3$)** | 100 | 100 $m^3$ used as a conservative default volume for an outdoors scenario (consistent with Stoffenmanager®) [6]. This is greater than the TRA default: 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. |
| **Inhalation transfer factor (fraction of total amount handled lost to air)** | 0.01 | Assumed to be equivalent to the value applied for general gasoline transfers where the emission loss is calculated to be ~0.001 for refuelling spillage and 0.002 for vapour displacement [7]. |
| **Oral Specific Parameters** | | |
| | N/a | Direct oral contact will only arise from intentional ingestion of the product. Significant indirect contact is unlikely due to volatility of substance. |

* 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. ATV tank size: http://www.honda.co.uk/atv/utilitywork/

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. US EPA (1991) Nonroad engine and vehicle emission study - Appendix I. EPA 460/3-91-02. Washington DC: US Environmental Protection Agency. Available at: http://www.epa.gov/7ED4305B-65A7-48A5-BE49-E678772E58E9/FinalDownload/DownloadId-EFFBEEB9194252F97C183AB28854372C/7ED4305B-65A7-48A5-BE49-E678772E58E9/nonroad/nrstdy_a.pdf

8. 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)

9. 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*

10. ten Berge, W. (2009) A simple dermal absorption model: Derivation and application. *Chemosphere 75, 11, 1440–1445*