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|---|---|---|---|---|
| 1. Title | 1.1 Title of SPERC | De-icing applications (consumer): solvent-borne | Y | Y |
| | 1.2 SPERC code | ESVOC SPERC 8.14b.v3 | Y | Y |
| 2. Scope | 2.1 Substance/Product Domain | | | |
| | Substance types / functions / properties included or excluded | Applicable to petroleum substances and petrochemicals. | Y | N |
| | Additional specification of product types covered: | Includes a variety of aliphatic and aromatic hydrocarbons, ketones, alcohols, acetates, glycols, glycol ethers, and glycol ether acetates. | Y | N |
| | Inclusion of sub-SPERCs | No | N | N |
| | 2.2 Process domain | | | |
| | Description of activities/processes: | Covers use for ice prevention and de-icing of vehicle, aircraft and other equipment by spraying. | Y | Y |
| | 2.3 List of applicable Use Descriptors | | | |
| | LCS | C – Consumer use | Y | Y |
| | SU | SU0 – Other | Y | Y |
| | PC | PC4 – Anti-freeze and de-cing products | Y | Y |
| 3. Operational conditions | 3.1 Conditions of use | | | |
| | Location of use | Outdoor | Y | Y |
| | Water contact during use | Yes | Y | Y |
| | Connected to a standard municipal biological STP | Yes | Y | Y |
| | Rigorously contained system with minimisation of release to the environment | No | Y | N |
| | Further operational conditions impacting on releases to the environment | Volatile compounds prone to atmospheric release. Wastewater emissions generated from equipment cleaning with water. | Y | Y |
| | 3.2 Waste Handling and Disposal | | | |
| | Waste Handling and Disposal: | Although household hazardous waste (HHW) represents a small portion of the total domestic waste produced by consumers, it needs to be separated from normal trash and amassed for special handling. Many regional municipalities have established voluntary procedures for the identification, collection, and disposal of HHW in a safe and efficient manner. Once amassed, the HHW can be transported to collection sites where it is reused, recycled, or incinerated. The handling and disposal of hazardous waste needs to conform with established practices and local/regional regulations in order to minimize environmental release and the potential for ecological harm.<br>Inglezakis, V.J., Moustakas, K. (2015). Household hazardous waste management: A review. Journal of Environmental Management 150, 310-321. doi: 10.1016/j.jenvman.2014.11.021. | Y | N |
| 4. Obligatory RMMs onsite | RMM limiting release to air: | No obligatory RMMs. | Y | Y |
| | RMM Efficiency (air): | Emissions to air are minimized when the product is used in accordance with the manufacturers' instructions and established practices. | Y | Y |
| | Reference for RMM Efficiency (air): | BCERF, 1999. Safe Use and Storage of Hazardous Household Products. Cornell University, Program on Breast Cancer and Environmental Risk | Y | N |

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| | | Factors. Ithaca, NY. https://extensionhealthyhomes.org/Documents/fs22.safeUse.pdf. | | |
| | **RMM limiting release to water:** | By default, the release to water is modified after biological treatment at a standard municipal sewage treatment plant (STP) with an effluent flow rate of 2,000 $m^3$/day. The effluent discharge rate is applicable to a group of 10,000 inhabitants who generate 200 L of wastewater per person. | Y | Y |
| | **RMM Efficiency (water):** | The removal efficiency is provided by the SimpleTreat model, which takes into consideration the biodegradability, partitioning behaviour, and volatility of an organic substance. Degradation assumes the operation of an aerobic activated-sludge reactor under steady-state conditions. | Y | Y |
| | **Reference for RMM Efficiency (water):** | ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment Version 3.0. European Chemicals Agency. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf | Y | N |
| | **RMM limiting release to soil:** | No obligatory RMMs. | Y | Y |
| | **RMM Efficiency (soil):** | Emissions to air are minimized when the product is used in accordance with the manufacturers' instructions and established practices. | Y | Y |
| | **Reference for RMM Efficiency (soil):** | BCERF, 1999. Safe Use and Storage of Hazardous Household Products. Cornell University, Program on Breast Cancer and Environmental Risk Factors. Ithaca, NY. https://extensionhealthyhomes.org/Documents/fs22.safeUse.pdf. | Y | N |
| **5. Exposure Assessment Input** | **5.1 Substance use rate** | | | |
| | **Amount of substance use per day:** | Supplied by registrant | Y | Y |
| | **Fraction of EU tonnage used in region:** | 10% (default value) | Y | N |
| | **Fraction of Regional tonnage used locally:** | 0.05% (default value) **(NB the value of 0.2% in the original factsheet includes the recommended adjustment factor of 4. This factor should not be used to arrive at a regional fraction and has been dropped. The proper use of the adjustment factor is noted in the background document.)** | Y | N |
| | **Justification / information source:** | ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment Version 3.0. European Chemicals Agency. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf | Y | N |
| | **5.2 Days emitting** | | | |
| | **Number of emission days per year:** | 365 (default value) | Y | Y |
| | **Justification / information source:** | ECHA, 2016. Guidance on Information Requirements and Chemical Safety Assessment. Chapter R.16: Environmental Exposure Assessment Version 3.0. European Chemicals Agency. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf | Y | N |
| | **5.3 Release factors** | | | |
| | **sub-SPERC identifier:** | ESVOC 8.14b.v3 | Y | N |
| | **ERC** | ERC 8d | | |
| | **sub-SPERC applicability:** | None | Y | N |
| | **5.3.1 Release Factor – air** | | | |
| | **Numeric value / percent of input amount (Air)** | 2% | Y | Y |
| | **Justification of RFs (Air):** | Two investigations have examined the air emissions accompanying the use windshield deicing agents. The first, Canadian study, estimated the emission factor for a winter washer fluid blend based on the usage volume | Y | N |

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| | | and assumed 100% volatilization of the methanol component with no wet deposition (Carriere et al., 2000). The emission factors over a four-month period ranged from 3.25% to 24%. In another Dutch/Finnish study, the emission factors for three polar solvents used to formulate the different windshield washer fluids were determined on an annual basis from 2002 to 2014 (Visschedijk et al., 2021). The highest observed factor was calculated to be 0.00006% taking into consideration the distance travelled and the fluid market volume. Taking both sets of data into consideration an air release factor of 2% is advocated for use. This value contains an adequate margin of safety and adequately considers differences in use patterns for different regions.<br>Carrière A., Kaufmann C., Shapiro J., Paine P., Prinsen J. H. (2000). The contribution of methanol (VOC) emissions from windshield washer fluid use to the formation of ground-level ozone. SAE Transactions; 109: 227-234.<br>Visschedijk A., Meesters J. A. J., Nijkamp M. M., Koch W. W. R., Jansen B. I., Dröge R. (2021). Methodology for the Calculation of Emissions from Product Usage by Consumers, Construction, and Services. National institute for Public Health and the Environment. Available from: https://www.rivm.nl/bibliotheek/rapporten/2021-0002.pdf | | |
| | **5.3.2 Release Factor – water** | | | |
| | **Numeric value / percent of input amount (Water):** | 71% | Y | Y |
| | **Justification of RFs (Water):** | Wintertime application of a windshield deicer will result in its deposition to the roadside as a result of wind shearing. Its accumulation and removal from the shoulder of the road is directly impacted by the freezing conditions with infiltration into the frozen soil retarded and its removal in snow/frost melt augmented. Release factors were identified from an examination of meltwater movement during daily wintertime thaw events in a Swedish field composed of loam soil (Engelmark, 1984). Field measurements found that 81% of the meltwater infiltrated the soil, whereas 19% was lost as surface runoff. Mass balance analysis shows that 88% (100 minus air plus waste) of the deicer VOCs will be lost to roadside water and soil after they are sheared from the windshield. The application of the meltwater fractions to this amount yields a water release factor of 71% and a soil release factor of 17%. These values are considered to be representative of the winter conditions that exist on the roadway shoulders receiving the used and sloughed windshield deicing fluid.<br>Engelmark, H., 1984. Infiltration in unsaturated frozen soil. Hydrology Research 15, 243-252. | Y | N |
| | **5.3.3 Release Factor – soil** | | | |
| | **Numeric value / percent of input amount (Soil):** | 17% | Y | Y |
| | **Justification of RFs (Soil):** | Wintertime application of a windshield deicer will result in its deposition to the roadside as a result of wind shearing. Its accumulation and removal from the shoulder of the road is directly impacted by the freezing conditions with infiltration into the frozen soil retarded and its removal in snow/frost melt augmented. Release factors were identified from an examination of meltwater movement during daily wintertime thaw events in a Swedish field composed of loam soil (Engelmark, 1984). Field measurements found that 81% of the meltwater infiltrated the soil, whereas 19% was lost as surface runoff. Mass balance analysis shows that 88% (100 minus air plus waste) of the deicer VOCs will be lost to roadside water and soil after they are sheared from the windshield. The application of the meltwater fractions to this amount yields a water release factor of 71% and a soil release factor of 17%. These values are considered to be representative of the winter conditions that exist on the roadway shoulders receiving the used and sloughed windshield deicing fluid.<br>Engelmark, H., 1984. Infiltration in unsaturated frozen soil. Hydrology Research 15, 243-252.. | Y | N |
| | **5.3.4 Release Factor – waste** | | | |

| - FS Section | Content field | Explanation of content | CSR | eSDS |
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| | **Percent of input amount disposed as waste:** | 10% | Y | N |
| | **Justification of RFs:** | The waste generation factor was taken from a life cycle assessment of a commercial antifreeze solution suitable for use in automobiles (Hunt, 1996). The stated value represents the amount of ethylene glycol waste that is generated as a result of improper disposal of a 50% ethylene glycol solution. An uncertainty factor has not been applied to this value since a portion of the waste includes the improper release to surface water and soil.<br>Hunt, R.G. et al. (1996). Life cycle assessment of ethylene glycol and propylene glycol antifreeze, International Congress & Exposition, SAE Technical Paper, Detroit, MI. | Y | N |
| **References to SPERC Background Document** | | | | |
| | Reference to Background Document | ESIG/ESVOC (2023). SpERC Background Document (2nd edition). Specific Environmental Release Categories (SpERCs) for the consumer use of solvents and solvent-borne substances for agrochemical use, de-icing applications, and water treatment chemicals. European Solvents Industry Group. Brussels, Belgium. | Y | N |