- FS Section	Content field	Explanation of content	CSR	eSDS
1. Title	**1.1 Title of SPERC**	Cleaning agents (consumer): solvent-borne	Y	Y
	1.2 SPERC code	ESVOC SPERC 8.4c.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 general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, and air care products.	Y	Y
	2.3 List of applicable Use Descriptors			
	LCS	C – Consumer use	Y	Y
	SU	SU0 - Other	Y	Y
	PC	PC35 – Washing and cleaning products	Y	Y
3. Operational conditions	**3.1 Conditions of use**			
	Location of use	Indoor/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. 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

- FS Section	Content field	Explanation of content	CSR	eSDS
		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)	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 8.4c.v3 nonpolar organics	Y	N
	ERC	ERC 8a ERC 8d		
	sub-SPERC applicability:	Yes	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air)	25%	Y	Y
	Justification of RFs (Air):	Products such as carburetor/choke/engine cleaners formulated using nonpolar organics (Sorli et al., 2022). The constituent hydrocarbons are generally characterized as having modestly high vapor pressures and water solubilities. The air release potential for these substances can be assessed using the factors issued in the A-Tables of Appendix 1 in the Technical Guidance Document (TGD) on Risk Assessment Part II	Y	N

- FS Section	Content field	Explanation of content	CSR	eSDS
		(EC,2003). Category IC =5 (personal/domestic) specifically covers the air, water, and soil release associated with the private consumer use of cleaning and washing products formulated with hydrocarbon solvents. Table A4.1 specifies an air release factor of 25% for the solvents used in consumer cleaning products. Sørli, J.B., Frederiksen, M., Nikolov, N.G., Wedebye, E.B., Hadrup, N., 2022. Identification of substances with a carcinogenic potential in spray-formulated engine/brake cleaners and lubricating products, available in the European Union (EU)–based on IARC and EU-harmonised classifications and QSAR predictions. Toxicology 477, 1-9. EC, 2003. Technical Guidance Document on Risk Assessment (EUTGD), Part II European Commission. Brussels, Belgium. https://echa.europa.eu/documents/10162/16960216/tgdpart2_2ed_en.pdf.		
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	60%	Y	Y
	Justification of RFs (Water):	Appendix A of the Technical Guidance Document on risk assessment lists a water release factor for consumer products formulated with volatile solvents (EC, 2003). Table 4.1 identifies a water release factor of 60% for consumer cleaning products containing solvents with a moderately high vapor pressure and limited water solubility. EC, 2003. Technical Guidance Document on Risk Assessment (EUTGD), Part II European Commission. Brussels, Belgium. https://echa.europa.eu/documents/10162/16960216/tgdpart2_2ed_en.pdf.	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	11%	Y	Y
	Justification of RFs (Soil):	A mass balance approach was used to establish the soil release factor for the consumer use of nonpolar cleaning agents such as engine and brake cleaners. The value was calculated by summing the air, water, and waste factors and subtracting the resulting value from 100% to obtain a difference. The calculated soil release factor of 11% ensures that the overall mass budget is maintained.	Y	N
	5.3.4 Release Factor – waste			
	Percent of input amount disposed as waste:	4%	Y	N
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the use of a solvent-containing general-purpose cleaner (Curren, 2003). The reported value represents the amount of hazardous waste that is generated when 0.7 L (3 cups) are used to clean 1000 ft^2 of a hard surface. An adjustment factor has not been applied to this value since the assessment is representative of use conditions associated with a wide range of professional cleaning products. Curran, M.A. (2003). Do bio-based products move us toward sustainability? A look at three USEPA case studies. Environmental Progress & Sustainable Energy 22, 277-292.	Y	N
	sub-SPERC identifier:	ESVOC 8.4c.v3 polar organics	Y	N
	ERC	ERC 8a ERC 8d		
	sub-SPERC applicability:	Yes	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air)	0.5%	Y	Y
	Justification of RFs (Air):	Research on water soluble cleaning products such as dishwater detergents, close-washing detergents, or surface cleaners examined the air release of 18 polar formulating solvents (Shin et al., 2016). Modeling showed that up to 0.4% could be emitted during normal use. Based on	Y	N

- FS Section	Content field	Explanation of content	CSR	eSDS
		the results from this study an air release factor of 0.5% is proposed for the consumer use of water-soluble cleaning products. Shin H.-M., McKone T. E., Bennett D. H. (2016). Volatilization of low vapor pressure–volatile organic compounds (LVP–VOCs) during three cleaning products-associated activities: Potential contributions to ozone formation. Chemosphere; 153: 130-137.		
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	95%	Y	Y
	Justification of RFs (Water):	A down-the-drain fraction was determined for 18 polar solvents used to formulate a variety of consumer cleaning agents (Shin et al., 2017). Estimation of the water release fraction relied on the principle of mass balance and assumed that the portion of solvent not released to air was disposed of down-the-drain. This approach showed that 99% of the aqueous polar cleaning agent solvents found their way into a municipal sewer. The value has been reduced slightly to take waste disposal practices into consideration. Consequently, a water release factor of 95% is recommended for the consumer use of aqueous-based household cleaning products formulated with polar solvents. Shin H. M., McKone T. E., Bennett D. H. (2017). Model framework for integrating multiple exposure pathways to chemicals in household cleaning products. Indoor air; 27: 829-839.	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	0.5%	Y	Y
	Justification of RFs (Soil):	The uncontrolled pouring of unused consumer cleaning products onto the ground has been shown to be an uncommon practice McEvoy et al., 1993; Wolf et al., 1997). There is however, a slight possibility that some soil release will occur due to careless disposal practice. The fraction lost to soil has therefore been determined based on mass balance considerations. Since the sum total of the mass releases to air, water, and waste is equivalent to 99.5%, the soil release factor for the use of consumer cleaning products containing polar solvents was set at 0.5%. McEvoy J. W., Rossignol A. M. (1993). Household hazardous waste disposal in Benton County, Oregon. Journal of Environmental Health; 56: 11-15. Wolf A. M. A., Kettler L. E., Leahy J. F., Spitz A. H. (1997). Surveying household hazardous waste generation and collection. Journal of Environmental Health; 59: 6-11.	Y	N
	5.3.4 Release Factor – waste			
	Percent of input amount disposed as waste:	4%	Y	N
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the use of a solvent-containing general-purpose cleaner (Curren, 2003). The reported value represents the amount of hazardous waste that is generated when 0.7 L (3 cups) are used to clean 1000 ft^2 of a hard surface. An adjustment factor has not been applied to this value since the assessment is representative of use conditions associated with a wide range of professional cleaning products. Curran, M.A. (2003). Do bio-based products move us toward sustainability? A look at three USEPA case studies. Environmental Progress & Sustainable Energy 22, 277-292.	Y	N
References to SPERC Background Document				
	5.1 Substance use rate	ESIG/ESVOC (2023). SpERC Background Document (2nd edition). Specific Environmental Release Categories (SpERCs) for the consumer use of solvents and solvent-borne substances in coatings, cleaners, and functional fluids. European Solvents Industry Group. Brussels, Belgium.	Y	N