FS Section	Content field	Explanation of content	CSR	eSDS
1. Title	1.1 Title of SPERC	Use as blowing agent (industrial): solvent-borne	Y	Y
	1.2 SPERC code	ESVOC SPERC 4.9.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	Yes	N	N
	2.2 Process domain			
	Description of activities/processes:	Use as a blowing agent for rigid and flexible foams, including material transfers, mixing and injection, curing, cutting, storage and packing.	Y	Y
	2.3 List of applicable Use Descriptors			
	LCS	IS – Use at industrial sites	Y	Y
	SU	SU18 – Manufacture of furniture	Y	Y
	PC	PC32 – Polymer preparations and compounds	Y	Y
3. Operational conditions	3.1 Conditions of use			
	Location of use	Indoor	Y	Y
	Water contact during use	Yes	Y	Y
	Connected to a standard municipal biological STP	No, site specifc biological STP with assumed discharge rate of municipal biological STP of >= 2000 m^3/day	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 subject to air emission controls. Wastewater emissions generated from equipment cleaning with water.	Y	Y
	3.2 Waste Handling and Disposal			
	Waste Handling and Disposal:	Residual raw materials and are in some cases recycled and fed back into the process reactor to improve efficiencies. In other cases, residues and by-products are used as raw materials for other downstream applications (EU, 2016). Wastewater generated during cleaning and maintenance operations is directed to a waste water treatment plant for biological degradation. Atmospheric release of waste vapour may be ameliorated using wet scrubbers, thermal oxidizers, solid adsorbents, membrane separators, biofilters, and/or cold oxidizers for trapping residual vapours. Solvent-containing liquid cleaning wastes are handled as hazardous waste and disposed of via thermal or catalytic incineration capable of efficiently converting volatile organic compounds to carbon dioxide and water. Hazardous waste handling conforms with the requirements of the Waste Framework Directive and includes procedures that minimize release during production, collection, storage, transportation, and treatment. These measures include a ban on the mixing of waste types, suitable	Y	N

FS Section	Content field	Explanation of content	CSR	eSDS
		packaging and labelling, and detailed documentation on the sources, quantities, and characteristics of the waste. EU (2016). Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector. Report EUR 28112 EN. European IPPC Bureau. Seville, Spain. http://eippcb.jrc.ec.europa.eu/reference/BREF/CWW_Bref_2016_published.pdf EU (2008). Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. Official Journal of the European Union 22.11.2008. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0098&from=EN		
4. Obligatory RMMs onsite	**RMM limiting release to air:**	No obligatory RMMs.	Y	Y
	RMM Efficiency (air):	Optional RMMs have been assigned a nominal removal efficiency value that is not accounted for in the air release factor. See the background document for more information.	Y	Y
	Reference for RMM Efficiency (air):	EU (2016). Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector. Report EUR 28112 EN. European IPPC Bureau. Seville, Spain. http://eippcb.jrc.ec.europa.eu/reference/BREF/CWW_Bref_2016_published.pdf	Y	N
	RMM limiting release to water:	Oil-water separation (e.g. *via* oil water separators, oil skimmers, or dissolved air flotation) is required.	Y	Y
	RMM Efficiency (water):	The efficiency of this RMM varies dependent on the treatment technology and the properties of the substance.	Y	Y
	Reference for RMM Efficiency (water):	EU (2016). Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector. Report EUR 28112 EN. European IPPC Bureau. Seville, Spain. http://eippcb.jrc.ec.europa.eu/reference/BREF/CWW_Bref_2016_published.pdf	Y	N
	RMM limiting release to soil:	The sludge generated from wastewater treatment is not applied to agricultural soil.	Y	Y
	RMM Efficiency (soil):	Not applicable	Y	Y
	Reference for RMM Efficiency (soil):	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. Exposure Assessment Input	**5.1 Substance use rate**			
	Amount of substance use per day:	50,000 kg/day	Y	Y
	Fraction of EU tonnage used in region:	100%	Y	N
	Fraction of Regional tonnage used locally:	100%	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:	300 (default value)	Y	Y

FS Section	Content field	Explanation of content	CSR	eSDS
	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 4.9.a.v3 WS <1 mg/l	Y	N
	ERC	ERC 4		
	sub-SPERC applicability:	Water solubility <1 mg/l	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air)	98%	Y	Y
	Justification of RFs (Air):	The value has been adopted from an authoritative literature source that documents the release factors for each environmental release category (ERC). The preceding value corresponds to to the default release factor for the industrial use of a non-reactive processing aid (ERC 4). ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment Version 3.0. Appendix A.16-1. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf	Y	N
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	0.001%	Y	Y
	Justification of RFs (Water):	The approach used to assign this value examines the use of a blowing agent to produce expanded polyurethane foam. Water usage and blowing agent consumption were used to determine a wastewater generation rate that was then converted to a water release factor. EPS Indusrry Alliance, 2016. Cradle-to-Gate Life Cycle Analysis of Expanded Polystyrene Resin. EPS Indusrry Alliance. Crofton, MD. https://www.epsindustry.org/sites/default/files/LCA%20of%20EPS%20Resin%20LCA%202017.pdf	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	0.0%	Y	Y
	Justification of RFs (Soil):	The approach used to assign this value is largely qualitative in nature and takes advantage of the sector knowledge and professional judgement of individuals within the expert group responsible for creating this SpERC factsheet. The determinations employ an informed decision-making process that is ultimately reviewed and agreed upon by a broad group of knowledgeable specialists within the sector organization (CEFIC, 2012). CEFIC (2012). Cefic Guidance Specific Environmental Release Categories (SPERCs) Chemical Safety Assessments, Supply Chain Communication and Downstream User Compliance. Revision 2, European Chemical Industry Council, Brussels, Belgium, http://www.cefic.org/Documents/IndustrySupport/REACH-Implementation/Guidance-and-Tools/SPERCs-Specific-Envirnonmental-Release-Classes.pdf	Y	N
	5.3.4 Release Factor – waste			
	Percent of input amount disposed as waste:	2.0%	Y	N

FS Section	Content field	Explanation of content	CSR	eSDS
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the commercial production of flexible polyurethane foams using a blowing agent (Plastics Europe, 2005). The value represents the amount of incinerated solid waste associated with foam production. An uncertainty factor of has not been applied to this value because the waste factor includes a substantial quantity of hazardous waste that has not come into contact with a blowing agent. PlasticsEurope (2005). Eco-profiles of the European Plastics Industry: Polyurethane Flexible Foam. Association of Plastics Manufacturers. Brussels, Belgium. https://isopa.org/media/1091/flexible-foam-lci.pdf.	Y	N
	sub-SPERC identifier:	ESVOC 4.9.b.v3 WS 1-10 mg/l	Y	N
	ERC:	ERC 4		
	sub-SPERC applicability:	Water solubility 1-10 mg/l	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air):	98%	Y	Y
	Justification of RFs (Air):	The value has been adopted from an authoritative literature source that documents the release factors for each environmental release category (ERC). The preceding value corresponds to to the default release factor for the industrial use of a non-reactive processing aid (ERC 4). ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment Version 3.0. Appendix A.16-1. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf	Y	N
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	0.004%	Y	Y
	Justification of RFs (Water):	The approach used to assign this value examines the use of a blowing agent to produce expanded polyurethane foam. Water usage and blowing agent consumption were used to determine a wastewater generation rate that was then converted to a water release factor. EPS Indusrry Alliance, 2016. Cradle-to-Gate Life Cycle Analysis of Expanded Polystyrene Resin. EPS Indusrry Alliance. Crofton, MD. https://www.epsindustry.org/sites/default/files/LCA%20of%20EPS%20Resin%20LCA%202017.pdf	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	0.0%	Y	Y
	Justification of RFs (Soil):	The approach used to assign this value is largely qualitative in nature and takes advantage of the sector knowledge and professional judgement of individuals within the expert group responsible for creating this SpERC factsheet. The determinations employ an informed decision-making process that is ultimately reviewed and agreed upon by a broad group of knowledgeable specialists within the sector organization (CEFIC, 2012). CEFIC (2012). Cefic Guidance Specific Environmental Release Categories (SPERCs) Chemical Safety Assessments, Supply Chain Communication and Downstream User Compliance. Revision 2, European Chemical Industry Council, Brussels, Belgium, http://www.cefic.org/Documents/IndustrySupport/REACH-Implementation/Guidance-and-Tools/SPERCs-Specific-Envirnonmental-Release-Classes.pdf	Y	N
	5.3.4 Release Factor – waste			

FS Section	Content field	Explanation of content	CSR	eSDS
	Percent of input amount disposed as waste:	2.0%	Y	N
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the commercial production of flexible polyurethane foams using a blowing agent (Plastics Europe, 2005). The value represents the amount of incinerated solid waste associated with foam production. An uncertainty factor of has not been applied to this value because the waste factor includes a substantial quantity of hazardous waste that has not come into contact with a blowing agent. PlasticsEurope (2005). Eco-profiles of the European Plastics Industry: Polyurethane Flexible Foam. Association of Plastics Manufacturers. Brussels, Belgium. https://isopa.org/media/1091/flexible-foam-lci.pdf.	Y	N
	sub-SPERC identifier:	ESVOC 4.9.c.v3 WS 10-100 mg/l	Y	N
	ERC	ERC 4		
	sub-SPERC applicability:	Water Solubility 10-100 mg/l	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air):	98%	Y	Y
	Justification of RFs (Air):	The value has been adopted from an authoritative literature source that documents the release factors for each environmental release category (ERC). The preceding value corresponds to to the default release factor for the industrial use of a non-reactive processing aid (ERC 4). ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment Version 3.0. Appendix A.16-1. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf	Y	N
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	0.04%	Y	Y
	Justification of RFs (Water):	The approach used to assign this value examines the use of a blowing agent to produce expanded polyurethane foam. Water usage and blowing agent consumption were used to determine a wastewater generation rate that was then converted to a water release factor. EPS Indusrry Alliance, 2016. Cradle-to-Gate Life Cycle Analysis of Expanded Polystyrene Resin. EPS Indusrry Alliance. Crofton, MD. https://www.epsindustry.org/sites/default/files/LCA%20of%20EPS%20Resin%20LCA%202017.pdf	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	0.0%	Y	Y
	Justification of RFs (Soil):	The approach used to assign this value is largely qualitative in nature and takes advantage of the sector knowledge and professional judgement of individuals within the expert group responsible for creating this SpERC factsheet. The determinations employ an informed decision-making process that is ultimately reviewed and agreed upon by a broad group of knowledgeable specialists within the sector organization (CEFIC, 2012). CEFIC (2012). Cefic Guidance Specific Environmental Release Categories (SPERCs) Chemical Safety Assessments, Supply Chain Communication and Downstream User Compliance. Revision 2, European Chemical Industry Council, Brussels, Belgium, http://www.cefic.org/Documents/IndustrySupport/REACH-Implementation/Guidance-and-Tools/SPERCs-Specific-Envirnonmental-Release-Classes.pdf	Y	N

FS Section	Content field	Explanation of content	CSR	eSDS
	5.3.4 Release Factor – waste			
	Percent of input amount disposed as waste:	2.0%	Y	N
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the commercial production of flexible polyurethane foams using a blowing agent (Plastics Europe, 2005). The value represents the amount of incinerated solid waste associated with foam production. An uncertainty factor of has not been applied to this value because the waste factor includes a substantial quantity of hazardous waste that has not come into contact with a blowing agent. PlasticsEurope (2005). Eco-profiles of the European Plastics Industry: Polyurethane Flexible Foam. Association of Plastics Manufacturers. Brussels, Belgium. https://isopa.org/media/1091/flexible-foam-lci.pdf.	Y	N
	sub-SPERC identifier:	ESVOC 4.9.d.v3 WS 100-1000 mg/l	Y	N
	ERC	ERC 4		
	sub-SPERC applicability:	Water Solubility 100-1000 mg/l	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air):	98%	Y	Y
	Justification of RFs (Air):	The value has been adopted from an authoritative literature source that documents the release factors for each environmental release category (ERC). The preceding value corresponds to to the default release factor for the industrial use of a non-reactive processing aid (ERC 4). ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment Version 3.0. Appendix A.16-1. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf	Y	N
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	0.4%	Y	Y
	Justification of RFs (Water):	The approach used to assign this value examines the use of a blowing agent to produce expanded polyurethane foam. Water usage and blowing agent consumption were used to determine a wastewater generation rate that was then converted to a water release factor. EPS Indusrry Alliance, 2016. Cradle-to-Gate Life Cycle Analysis of Expanded Polystyrene Resin. EPS Indusrry Alliance. Crofton, MD. https://www.epsindustry.org/sites/default/files/LCA%20of%20EPS%20Resin%20LCA%202017.pdf	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	0.0%	Y	Y
	Justification of RFs (Soil):	The approach used to assign this value is largely qualitative in nature and takes advantage of the sector knowledge and professional judgement of individuals within the expert group responsible for creating this SpERC factsheet. The determinations employ an informed decision-making process that is ultimately reviewed and agreed upon by a broad group of knowledgeable specialists within the sector organization (CEFIC, 2012). CEFIC (2012). Cefic Guidance Specific Environmental Release Categories (SPERCs) Chemical Safety Assessments, Supply Chain Communication and Downstream User Compliance. Revision 2, European Chemical Industry Council, Brussels, Belgium,	Y	N

FS Section	Content field	Explanation of content	CSR	eSDS
		http://www.cefic.org/Documents/IndustrySupport/REACH-Implementation/Guidance-and-Tools/SPERCs-Specific-Envirnonmental-Release-Classes.pdf		
	5.3.4 Release Factor – waste			
	Percent of input amount disposed as waste	2.0%	Y	N
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the commercial production of flexible polyurethane foams using a blowing agent (Plastics Europe, 2005). The value represents the amount of incinerated solid waste associated with foam production. An uncertainty factor of has not been applied to this value because the waste factor includes a substantial quantity of hazardous waste that has not come into contact with a blowing agent. PlasticsEurope (2005). Eco-profiles of the European Plastics Industry: Polyurethane Flexible Foam. Association of Plastics Manufacturers. Brussels, Belgium. https://isopa.org/media/1091/flexible-foam-lci.pdf.	Y	N
	sub-SPERC identifier:	ESVOC 4.9.e.v3 WS >1000 mg/l	Y	N
	ERC	ERC 4		
	sub-SPERC applicability:	Water Solubility >1000 mg/l	Y	N
	5.3.1 Release Factor – air			
	Numeric value / percent of input amount (Air):	98%	Y	Y
	Justification of RFs (Air):	The value has been adopted from an authoritative literature source that documents the release factors for each environmental release category (ERC). The preceding value corresponds to to the default release factor for the industrial use of a non-reactive processing aid (ERC 4). ECHA (2016). Guidance on Information Requirements and Chemical Safety Assessment Chapter R.16: Environmental exposure assessment Version 3.0. Appendix A.16-1. Helsinki, Finland. https://echa.europa.eu/documents/10162/13632/information_requirements_r16_en.pdf	Y	N
	5.3.2 Release Factor – water			
	Numeric value / percent of input amount (Water):	1.2%	Y	Y
	Justification of RFs (Water):	The approach used to assign this value examines the use of a blowing agent to produce expanded polyurethane foam. Water usage and blowing agent consumption were used to determine a wastewater generation rate that was then converted to a water release factor. EPS Indusrry Alliance, 2016. Cradle-to-Gate Life Cycle Analysis of Expanded Polystyrene Resin. EPS Indusrry Alliance. Crofton, MD. https://www.epsindustry.org/sites/default/files/LCA%20of%20EPS%20Resin%20LCA%202017.pdf	Y	N
	5.3.3 Release Factor – soil			
	Numeric value / percent of input amount (Soil):	0.0%	Y	Y
	Justification of RFs (Soil):	The approach used to assign this value is largely qualitative in nature and takes advantage of the sector knowledge and professional judgement of individuals within the expert group responsible for creating this SpERC factsheet. The determinations employ an informed decision-making process that is ultimately reviewed and agreed upon by a broad group of knowledgeable specialists within the sector organization (CEFIC, 2012).	Y	N

FS Section	Content field	Explanation of content	CSR	eSDS
		CEFIC (2012). Cefic Guidance Specific Environmental Release Categories (SPERCs) Chemical Safety Assessments, Supply Chain Communication and Downstream User Compliance. Revision 2, European Chemical Industry Council, Brussels, Belgium, http://www.cefic.org/Documents/IndustrySupport/REACH-Implementation/Guidance-and-Tools/SPERCs-Specific-Envirnonmental-Release-Classes.pdf		
	5.3.4 Release Factor – waste			
	Percent of input amount disposed as waste:	2.0%	Y	N
	Justification of RFs:	The waste generation factor was taken from a life cycle assessment for the commercial production of flexible polyurethane foams using a blowing agent (Plastics Europe, 2005). The value represents the amount of incinerated solid waste associated with foam production. An uncertainty factor of has not been applied to this value because the waste factor includes a substantial quantity of hazardous waste that has not come into contact with a blowing agent. PlasticsEurope (2005). Eco-profiles of the European Plastics Industry: Polyurethane Flexible Foam. Association of Plastics Manufacturers. Brussels, Belgium. https://isopa.org/media/1091/flexible-foam-lci.pdf.	Y	N
References to SPERC Background Document				
	Reference to Background Document	ESIG/ESVOC (2019). SpERC Background Document. Specific Environmental Release Categories (SpERCs) for the use of solvents and solvent borne substances in the industrial production and/or use of explosives, synthetic rubbers, and blowing agents. European Solvents Industry Group. Brussels, Belgium.	Y	N