FS Section	Content field	CSR	eSDS
1. Title	**1.1 Spray application of plant protection products containing co-formulants**	Y	Y
	1.2 CLE SpERC 8d.2.v4	Y	Y
2. Scope	**2.1 Substance/Product Domain**		
	Substance types / functions / properties included: Solid and liquid substances used as a co-formulant	Y	Y
	Additional specification of product types covered: Products (substances or mixtures) applied as a liquid spray, including volatile solvents with vapour pressure ≥0.01 Pa used in liquid seed treatment formulations.	Y	Y
	Inclusion of sub-SPERCs: y	N	N
	2.2 Process domain		
	Description of activities/processes: Mixing and loading of plant protection products into delivery equipment. Spray application of plant protection products. Cleaning and maintenance of equipment is included.	Y	N
	2.3 List of applicable Use Descriptors		
	LCS: Widespread use by professional workers, Consumer use	Y	Y
	SU: 1	Y	Y
	PROC: 8a, 11	Y	Y
	PC: 27	Y	Y
	ERC: 8d	Y	Y
3. Operational conditions	**3.1 Conditions of use**		
	Location of use: Indoor and outdoor use	Y	Y
	Water contact during use: n	Y	Y
	Connected to a standard municipal biological STP: n	Y	Y
	Rigorously contained system with minimisation of release to the environment: n	Y	N
	Further operational conditions impacting on releases to the environment: Plant protection product approvals under Regulation (EC) No. 1107/2009 include specific labelling instructions designed to prevent emission to surface water / waste water. No intentional emission to surface water or waste water is permitted. Controlled application to agricultural crops in accordance with the product label and Good Agricultural Practice is required.	Y	Y
	3.2 Waste Handling and Disposal		
	Waste Handling and Disposal: Used packaging must be disposed of in accordance with the product labelling. It is recommended that plant protection product containers are triple or pressure rinsed or rinsed with a system that is an integral part of the sprayer. Rinse water should be added to the sprayer at time of filling. Properly rinsed containers may be disposed of as non-hazardous waste.	Y	Y
4. Obligatory RMMs onsite	**RMM limiting release to air**: none	Y	Y
	RMM Efficiency (air): n/a	Y	Y
	Reference for RMM Efficiency (air): n/a	Y	N
	RMM limiting release to water: none	Y	Y
	RMM Efficiency (water): n/a	Y	Y
	Reference for RMM Efficiency (water): n/a	Y	N
	RMM limiting release to soil: none	Y	Y
	RMM Efficiency (soil): n/a	Y	Y
	Reference for RMM Efficiency (soil): n/a	Y	N
5. Exposure Assessment Input	**5.1 Substance use rate**		
	Amount of substance use per day: not applicable	Y	Y
	Fraction of EU tonnage used in region: 0.1	Y	N
	Fraction of Regional tonnage used locally: 0	Y	N
	Justification / information source: The environmental risk assessment framework used for assessing chemicals under REACH (EU TGD) relies on nested multimedia mass balance models, which were developed to estimate environmental exposure arising from chemical use at industrial sites (point sources) and wide-dispersive uses in the catchment of a municipal sewage treatment plant. The EU TGD based models are mass balance ("tonnage") based and the key assumption at the local scale is that release to water will be via an industrial waste water or municipal sewage treatment plant before release to a river. Direct releases to water may be assumed, but direct releases to agricultural soil are not considered and are in fact outside the scope of the EU TGD. As a consequence, the default local exposure assessment approach does not take account of uses where substances may be directly applied onto agricultural soil, or where other direct emissions to surface water may take place. The Local Environment Tool (LET) approach developed by CropLife Europe is a standalone replacement for the local scale nested box in the models based on the EU TGD. Boundary concentrations should be calculated using the CLE SpERC (e.g. in EUSES, ECETOC TRA, CHESAR) and manually imported into CLE LET. Accordingly, the "fraction of regional tonnage used locally" is set to zero in this SpERC because the local scale output is not used. Local scale concentrations should be calculated using CLE LET. Instead of "Amount of substance use per day", the maximum use rate [kg/ha] output of CLE LET should be communicated as an outcome of the risk assessment in the extended Safety Data Sheet as an operational condition.	Y	N
	5.2 Days emitting		

FS Section	Content field	CSR	eSDS
	Number of emission days per year: not applicable	Y	Y
	Justification / information source: The default local exposure assessment approach is not applicable to substances used as a co-formulant in plant protection products. This assessment should be performed with the CLE LET, by using the default parameters and conditions of use implemented in and reported by the tool. For further details please consult the CLE guidance document.	Y	N
	5.3 Release factors		
	5.3.1 Release factors for substances with vapour pressure ≥0.01 Pa		
	SPERC identifier: CLE SpERC 8d.2a.v4	Y	N
	ERC: 8d	Y	N
	Sub-SPERC applicability: This sub-SpERC is applicable to substances having a vapour pressure ≥0.01 Pa and being used as a co-formulant in plant protection products, including volatile solvents with vapour pressure ≥0.01 Pa used as a co-formulant in liquid seed treatment formulations.	Y	N
	5.3.1.1 Release Factor – air		
	Numeric value / percent of input amount (Air): 1	Y	Y
	Justification of RFs (Air): The pesticides field application module in USES 4.0 (RIVM 2002, Table A-2 p211 and Table D-3 p318) implemented vapour pressure dependent emission fractions to air. The total emission to air values were derived from the averaged 24 hour emission strength, based on a 1 kg/m^2 application, assuming 90% of the emission occurs in the first day. These values were adopted without modification. The release factor is also applied to the special case of volatile solvents potentially used in seed treatment formulations because the solvent is lost to air on drying of the seed coating.	Y	N
	5.3.1.2 Release Factor – water		
	Numeric value / percent of input amount (Water): 0.002	Y	Y
	Justification of RFs (Water): Direct release of a co-formulant to surface water may occur by spray drift. The realistic worst case spray drift, expressed as a percentage of the application rate, was assumed to be 15.7%. This corresponds to the regulatory accepted 90th percentile spray drift value for citrus, olives and late applications to pome and stone fruit; and represents orchard and vineyard scenarios where high spray drift may be expected. The standard plant protection drift scenario assumes that a 1 hectare field is adjacent to a water body that constitutes 1% of the area of the treated field. Therefore, even if the water body was over sprayed at the same rate as the field, only 1% of the applied dose would enter that water body. Given that direct overspray does not in fact occur, and taking the worst case spray drift value of 15.7%, the fraction of the applied dose entering the water body reduces to 0.00157, or rounded to 0.002. The drainage density (the amount of land adjacent to water bodies and available for potential drift events) has not been considered in this calculation, which would lead to a further significant reduction in the tonnage of a co-formulant reaching surface water at the regional scale.	Y	N
	5.3.1.3 Release Factor – soil		
	Numeric value / percent of input amount (Soil): 0	Y	Y
	Justification of RFs (Soil): The fraction of a co-formulant reaching the soil can be significantly reduced due to crop interception, which is the fraction of the applied substance that is retained on the crop, and furthermore by volatilisation from spray droplets, and from plant surfaces and soil within the first 24 hours after application of the plant protection product. In the more conservative version 4 of the CLE SpERC, the worst case (i.e. no interception, where all of the sprayed formulation reaches the soil, and omit the other factors that may lead to a reduced emission) is assumed up to a cut-off vapour pressure of 0.01 Pa. For vapour pressures above 0.01 Pa, full volatilisation of the substance is assumed within 24 hours after the spray application.	Y	N
	5.3.1.4 Release Factor – waste		
	Percent of input amount disposed as waste: 0.0001	Y	N
	Justification of RFs: Product labels provide guidance for users on how to dispose of plant protection products. It is recommended that emptied containers are triple or pressure rinsed, or rinsed with a system that is integrated in the sprayer, prior to disposal. Washing in this manner has been demonstrated to retain negligible amounts of the formulation in the container. The rinse water should be added to the spray dilution at the time of filling, thus being accounted for within the overall emission fractions.	Y	N
	5.3.2 Release factors for substances with vapour pressure 0.001 – <0.01 Pa		
	SPERC identifier: CLE SpERC 8d.2b.v4	Y	N
	ERC: 8d	Y	N
	Sub-SPERC applicability: This sub-SpERC is applicable to substances having a vapour pressure 0.001 – <0.01 Pa and being used as a co-formulant in plant protection products.	Y	N
	5.3.2.1 Release Factor – air		
	Numeric value / percent of input amount (Air): 0.5	Y	Y
	Justification of RFs (Air): The pesticides field application module in USES 4.0 (RIVM 2002, Table A-2 p211 and Table D-3 p318) implemented vapour pressure dependent emission fractions to air. The total emission to air values were derived from the averaged 24 hour emission strength, based on a 1 kg/m^2 application, assuming 90% of the emission occurs in the first day. These values were adopted without modification.	Y	N
	5.3.2.2 Release Factor – water		

FS Section	Content field	CSR	eSDS
	Numeric value / percent of input amount (Water): 0.002	Y	Y
	Justification of RFs (Water): Direct release of a co-formulant to surface water may occur by spray drift. The realistic worst case spray drift, expressed as a percentage of the application rate, was assumed to be 15.7%. This corresponds to the regulatory accepted 90th percentile spray drift value for citrus, olives and late applications to pome and stone fruit; and represents orchard and vineyard scenarios where high spray drift may be expected. The standard plant protection drift scenario assumes that a 1 hectare field is adjacent to a water body that constitutes 1% of the area of the treated field. Therefore, even if the water body was over sprayed at the same rate as the field, only 1% of the applied dose would enter that water body. Given that direct overspray does not in fact occur, and taking the worst case spray drift value of 15.7%, the fraction of the applied dose entering the water body reduces to 0.00157, or rounded to 0.002. The drainage density (the amount of land adjacent to water bodies and available for potential drift events) has not been considered in this calculation, which would lead to a further significant reduction in the tonnage of a co-formulant reaching surface water at the regional scale.	Y	N
	5.3.2.3 Release Factor – soil		
	Numeric value / percent of input amount (Soil): 1	Y	Y
	Justification of RFs (Soil): The fraction of a co-formulant reaching the soil can be significantly reduced due to crop interception, which is the fraction of the applied substance that is retained on the crop, and furthermore by volatilisation from spray droplets, and from plant surfaces and soil within the first 24 hours after application of the plant protection product. In the more conservative version 4 of the CLE SpERC, the worst case (i.e. no interception, where all of the sprayed formulation reaches the soil, and omit the other factors that may lead to a reduced emission) is assumed up to a cut-off vapour pressure of 0.01 Pa. For vapour pressures above 0.01 Pa, full volatilisation of the substance is assumed within 24 hours after the spray application.	Y	N
	5.3.2.4 Release Factor – waste		
	Percent of input amount disposed as waste: 0.0001	Y	N
	Justification of RFs: Product labels provide guidance for users on how to dispose of plant protection products. It is recommended that emptied containers are triple or pressure rinsed, or rinsed with a system that is integrated in the sprayer, prior to disposal. Washing in this manner has been demonstrated to retain negligible amounts of the formulation in the container. The rinse water should be added to the spray dilution at the time of filling, thus being accounted for within the overall emission fractions.	Y	N
	5.3.3 Release factors for substances with vapour pressure 0.0001 – <0.001 Pa		
	SPERC identifier: CLE SpERC 8d.2c.v4	Y	N
	ERC: 8d	Y	N
	Sub-SPERC applicability: This sub-SpERC is applicable to substances having a vapour pressure 0.0001 – <0.001 Pa and being used as a co-formulant in plant protection products.	Y	N
	5.3.3.1 Release Factor – air		
	Numeric value / percent of input amount (Air): 0.2	Y	Y
	Justification of RFs (Air): The pesticides field application module in USES 4.0 (RIVM 2002, Table A-2 p211 and Table D-3 p318) implemented vapour pressure dependent emission fractions to air. The total emission to air values were derived from the averaged 24 hour emission strength, based on a 1 kg/m^2 application, assuming 90% of the emission occurs in the first day. These values were adopted without modification.	Y	N
	5.3.3.2 Release Factor – water		
	Numeric value / percent of input amount (Water): 0.002	Y	Y
	Justification of RFs (Water): Direct release of a co-formulant to surface water may occur by spray drift. The realistic worst case spray drift, expressed as a percentage of the application rate, was assumed to be 15.7%. This corresponds to the regulatory accepted 90th percentile spray drift value for citrus, olives and late applications to pome and stone fruit; and represents orchard and vineyard scenarios where high spray drift may be expected. The standard plant protection drift scenario assumes that a 1 hectare field is adjacent to a water body that constitutes 1% of the area of the treated field. Therefore, even if the water body was over sprayed at the same rate as the field, only 1% of the applied dose would enter that water body. Given that direct overspray does not in fact occur, and taking the worst case spray drift value of 15.7%, the fraction of the applied dose entering the water body reduces to 0.00157, or rounded to 0.002. The drainage density (the amount of land adjacent to water bodies and available for potential drift events) has not been considered in this calculation, which would lead to a further significant reduction in the tonnage of a co-formulant reaching surface water at the regional scale.	Y	N
	5.3.3.3 Release Factor – soil		
	Numeric value / percent of input amount (Soil): 1	Y	Y
	Justification of RFs (Soil): The fraction of a co-formulant reaching the soil can be significantly reduced due to crop interception, which is the fraction of the applied substance that is retained on the crop, and furthermore by volatilisation from spray droplets, and from plant surfaces and soil within the first 24 hours after application of the plant protection product. In the more conservative version 4 of the CLE SpERC, the worst case (i.e. no interception, where all of the sprayed formulation reaches the soil, and omit the other factors that may lead to a reduced emission) is assumed up to a cut-off vapour pressure of 0.01 Pa. For	Y	N

FS Section	Content field	CSR	eSDS
	vapour pressures above 0.01 Pa, full volatilisation of the substance is assumed within 24 hours after the spray application.		
	5.3.3.4 Release Factor – waste		
	Percent of input amount disposed as waste: 0.0001	Y	N
	Justification of RFs: Product labels provide guidance for users on how to dispose of plant protection products. It is recommended that emptied containers are triple or pressure rinsed, or rinsed with a system that is integrated in the sprayer, prior to disposal. Washing in this manner has been demonstrated to retain negligible amounts of the formulation in the container. The rinse water should be added to the spray dilution at the time of filling, thus being accounted for within the overall emission fractions.	Y	N
	5.3.4 Release factors for substances with vapour pressure 0.00001 – <0.0001 Pa		
	SPERC identifier: CLE SpERC 8d.2d.v4	Y	N
	ERC: 8d	Y	N
	Sub-SPERC applicability: This sub-SpERC is applicable to substances having a vapour pressure 0.00001 – <0.0001 Pa and being used as a co-formulant in plant protection products.	Y	N
	5.3.4.1 Release Factor – air		
	Numeric value / percent of input amount (Air): 0.1	Y	Y
	Justification of RFs (Air): The pesticides field application module in USES 4.0 (RIVM 2002, Table A-2 p211 and Table D-3 p318) implemented vapour pressure dependent emission fractions to air. The total emission to air values were derived from the averaged 24 hour emission strength, based on a 1 kg/m^2 application, assuming 90% of the emission occurs in the first day. These values were adopted without modification.	Y	N
	5.3.4.2 Release Factor – water		
	Numeric value / percent of input amount (Water): 0.002	Y	Y
	Justification of RFs (Water): Direct release of a co-formulant to surface water may occur by spray drift. The realistic worst case spray drift, expressed as a percentage of the application rate, was assumed to be 15.7%. This corresponds to the regulatory accepted 90th percentile spray drift value for citrus, olives and late applications to pome and stone fruit; and represents orchard and vineyard scenarios where high spray drift may be expected. The standard plant protection drift scenario assumes that a 1 hectare field is adjacent to a water body that constitutes 1% of the area of the treated field. Therefore, even if the water body was over sprayed at the same rate as the field, only 1% of the applied dose would enter that water body. Given that direct overspray does not in fact occur, and taking the worst case spray drift value of 15.7%, the fraction of the applied dose entering the water body reduces to 0.00157, or rounded to 0.002. The drainage density (the amount of land adjacent to water bodies and available for potential drift events) has not been considered in this calculation, which would lead to a further significant reduction in the tonnage of a co-formulant reaching surface water at the regional scale.	Y	N
	5.3.4.3 Release Factor – soil		
	Numeric value / percent of input amount (Soil): 1	Y	Y
	Justification of RFs (Soil): The fraction of a co-formulant reaching the soil can be significantly reduced due to crop interception, which is the fraction of the applied substance that is retained on the crop, and furthermore by volatilisation from spray droplets, and from plant surfaces and soil within the first 24 hours after application of the plant protection product. In the more conservative version 4 of the CLE SpERC, the worst case (i.e. no interception, where all of the sprayed formulation reaches the soil, and omit the other factors that may lead to a reduced emission) is assumed up to a cut-off vapour pressure of 0.01 Pa. For vapour pressures above 0.01 Pa, full volatilisation of the substance is assumed within 24 hours after the spray application.	Y	N
	5.3.4.4 Release Factor – waste		
	Percent of input amount disposed as waste: 0.0001	Y	N
	Justification of RFs: Product labels provide guidance for users on how to dispose of plant protection products. It is recommended that emptied containers are triple or pressure rinsed, or rinsed with a system that is integrated in the sprayer, prior to disposal. Washing in this manner has been demonstrated to retain negligible amounts of the formulation in the container. The rinse water should be added to the spray dilution at the time of filling, thus being accounted for within the overall emission fractions.	Y	N
	5.3.5 Release factors for substances with vapour pressure <0.00001 Pa		
	SPERC identifier: CLE SpERC 8d.2e.v4	Y	N
	ERC: 8d	Y	N
	Sub-SPERC applicability: This sub-SpERC is applicable to substances having a vapour pressure <0.00001 Pa and being used as a co-formulant in plant protection products.	Y	N
	5.3.5.1 Release Factor – air		
	Numeric value / percent of input amount (Air): 0.01	Y	Y
	Justification of RFs (Air): The pesticides field application module in USES 4.0 (RIVM 2002, Table A-2 p211 and Table D-3 p318) implemented vapour pressure dependent emission fractions to air. The total emission to air values were derived from the averaged 24 hour emission strength, based on a 1 kg/m^2 application, assuming 90% of the emission occurs in the first day. These values were adopted without modification.	Y	N

FS Section	Content field	CSR	eSDS
	5.3.5.2 Release Factor – water		
	Numeric value / percent of input amount (Water): 0.002	Y	Y
	Justification of RFs (Water): Direct release of a co-formulant to surface water may occur by spray drift. The realistic worst case spray drift, expressed as a percentage of the application rate, was assumed to be 15.7%. This corresponds to the regulatory accepted 90th percentile spray drift value for citrus, olives and late applications to pome and stone fruit; and represents orchard and vineyard scenarios where high spray drift may be expected. The standard plant protection drift scenario assumes that a 1 hectare field is adjacent to a water body that constitutes 1% of the area of the treated field. Therefore, even if the water body was over sprayed at the same rate as the field, only 1% of the applied dose would enter that water body. Given that direct overspray does not in fact occur, and taking the worst case spray drift value of 15.7%, the fraction of the applied dose entering the water body reduces to 0.00157, or rounded to 0.002. The drainage density (the amount of land adjacent to water bodies and available for potential drift events) has not been considered in this calculation, which would lead to a further significant reduction in the tonnage of a co-formulant reaching surface water at the regional scale.	Y	N
	5.3.5.3 Release Factor – soil		
	Numeric value / percent of input amount (Soil): 1	Y	Y
	Justification of RFs (Soil): The fraction of a co-formulant reaching the soil can be significantly reduced due to crop interception, which is the fraction of the applied substance that is retained on the crop, and furthermore by volatilisation from spray droplets, and from plant surfaces and soil within the first 24 hours after application of the plant protection product. In the more conservative version 4 of the CLE SpERC, the worst case (i.e. no interception, where all of the sprayed formulation reaches the soil, and omit the other factors that may lead to a reduced emission) is assumed up to a cut-off vapour pressure of 0.01 Pa. For vapour pressures above 0.01 Pa, full volatilisation of the substance is assumed within 24 hours after the spray application.	Y	N
	5.3.5.4 Release Factor – waste		
	Percent of input amount disposed as waste: 0.0001	Y	N
	Justification of RFs: Product labels provide guidance for users on how to dispose of plant protection products. It is recommended that emptied containers are triple or pressure rinsed, or rinsed with a system that is integrated in the sprayer, prior to disposal. Washing in this manner has been demonstrated to retain negligible amounts of the formulation in the container. The rinse water should be added to the spray dilution at the time of filling, thus being accounted for within the overall emission fractions.	Y	N
References to SPERC Background Document [1]			
	Reference to Background Document: The background document "REACH Specific Environmental Release Categories for plant protection product applications" has been published in the scientific journal "*Integrated Environmental Assessment and Management*" and is accessible via DOI:10.1002/ieam.4251.	Y	N

[1] The objective of this factsheet is to summarize the SPERC key facts provided in the corresponding SPERC background documents. It gives an overview of the SPERC essentials for the chemical safety assessment. A SPERC background document is a reference document, which provides the description of the emission situation(s) for a use specified by an industrial sector, the justification and applicability domain of the environmental release factors, and the references/information sources/methods used in the derivation of the release factors.