

# **Renewal Assessment Report**

**beta-cyfluthrin**

**Volume 3 – B.2 Physical and chemical properties**

**07 March 2017**

**Rapporteur Member State: Germany**  
**Co-Rapporteur Member State: Hungary**

## Version history

When	What

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## B.2 Physical and chemical properties of the active substance

The studies reviewed and evaluated for the first Annex I inclusion of beta-cyfluthrin showed some deficiencies. This circumstance lead to the fact that the Task Force carried out a new set of physical and chemical studies in compliance with current guidelines and regulations.

The studies from the DAR which are not acceptable anymore are additionally provided in the table for completeness reason.

If not otherwise stated the methods used for determination of the physical and chemical properties were acceptably validated.

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
<b>B.2.1 Melting point and boiling point (CA 2.1)</b>						
Melting, freezing or solidification point	EC A 1 (DSC)	99.4 % (beta-cyfluthrin isomer II)	78.9 °C	Additional acceptable	Y	Smeykal (2012) (BVL no. 2632855)
	EC A 1 (DSC)	99.2 % (beta-cyfluthrin isomer IV)	104.3 °C	Additional acceptable	Y	Smeykal (2012) (BVL no. 2632856)
	EC A 1 (DSC, capillary method)	PAS: 98.8 % (beta-cyfluthrin)	82 – 96 °C	acceptable	Y	Smeykal (2007) (BVL no. 2632858)
	EC A 1 (DSC, capillary method)	TAS: 98.7 % (beta-cyfluthrin)	82 – 93 °C	additional information	Y	Smeykal (2007) (BVL no. 2632857)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
	EEC A 1 (DSC)	99.2 % (Isomer II) 99.8 % (Isomer IV)	80.7 °C  106.2 °C	acceptable (DAR)	N	Krohn, 1984 (CHE9400403)
Boiling point	EC A 2 (DSC)	99.4 % (beta- cyfluthrin isomer II)	The test item showed no boiling point at atmospheric conditions because it decomposed first starting at a temperature of 260 °C (glass crucibles) and 270 °C (aluminium crucibles).	acceptable	Y	Smeykal (2012) (BVL no. 2632855)
	EC A 2 (DSC)	99.2 % (beta- cyfluthrin isomer IV)	The test item showed no boiling point at atmospheric conditions because it decomposed first starting at a temperature of 255 °C (glass crucibles) and 260 °C (aluminium crucibles).	acceptable	Y	Smeykal (2012) (BVL no. 2632856)
	EC A 2 (DSC)	PAS: 98.8 % (beta- cyfluthrin)	The test item showed no boiling point at atmospheric condition, because it decomposed first at a temperature of approximately 210 °C.	acceptable	Y	Smeykal (2007) (BVL no. 2632858)
	EC A 2 (DSC)	TAS: 98.7 % (beta- cyfluthrin)	The test item showed no boiling temperature at atmospheric condition, because it decomposed first at a temperature of approximately 200 °C.	additional information	Y	Smeykal (2007) (BVL no. 2632857)
	OECD 113 (DTA, TGA)	97.5	Not measurable, decomposition above 210 °C	Not acceptable (DAR) Not sufficient information in the study	N	Mix and Berg, 1988 (CHE9500324)
Decomposition / Sublimation temperature	EC A 2 (DSC)	99.4 % (beta- cyfluthrin isomer II)	The test item showed no boiling point at atmospheric conditions because it decomposed first starting at a temperature of 260 °C (glass crucibles) and 270 °C (aluminium crucibles).	acceptable	Y	Smeykal (2012) (BVL no. 2632855)
	EC A 2 (DSC)	99.2 % (beta- cyfluthrin isomer IV)	The test item showed no boiling point at atmospheric conditions because it decomposed first starting at a temperature of 255 °C (glass crucibles) and 260 °C (aluminium crucibles).	acceptable	Y	Smeykal (2012) (BVL no. 2632856)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
	OECD 113 (DSC)	PAS: 98.8 % (beta-cyfluthrin)	The test item showed no boiling point at atmospheric condition, because it decomposed first at a temperature of approximately 210 °C.	acceptable	Y	Smeykal (2007) (BVL no. 2632858)
	OECD 113 (DSC)	TAS: 98.7 % (beta-cyfluthrin)	The test item showed no boiling temperature at atmospheric condition, because it decomposed first at a temperature of approximately 200 °C.	additional information	Y	Smeykal (2007) (BVL no. 2632857)
	OECD 113 (DSC, TGA)	97.5	DSC: No exothermic reaction below 210 °C TGA: Weight loss under air and nitrogen atm. above 170 °C	not acceptable (DAR) Not sufficient information in the study	N	Mix and Berg, 1988 (CHE9500324)
<b>B.2.2 Vapour pressure, volatility (CA 2.2)</b>						
Vapour pressure	EC A 4 (vapour pressure balance)	99.4 % (beta-cyfluthrin isomer II)	4.5 x 10 <sup>-7</sup> Pa (20 °C) 1.0 x 10 <sup>-6</sup> Pa (25 °C) 4.5 x 10 <sup>-5</sup> Pa (50 °C) extrapolated from measurements between 73.2 °C and 111.4 °C	acceptable	Y	Smeykal (2012) (BVL no. 2632859)
	EC A 4 (vapour pressure balance)	99.2 % (beta-cyfluthrin isomer IV)	2.2 x 10 <sup>-6</sup> Pa (20 °C) 4.6 x 10 <sup>-6</sup> Pa (25 °C) 1.2 x 10 <sup>-4</sup> Pa (50 °C) extrapolated from measurements between 79.6 °C and 129.8 °C	acceptable	Y	Smeykal (2012) (BVL no. 2632860)
	OECD 104 (vapour pressure balance)	97.4 % (Isomer II)  98.9 % (Isomer IV)	1.4 x 10 <sup>-8</sup> Pa (20 °C) 3.4 x 10 <sup>-7</sup> Pa (25 °C)  8.5 x 10 <sup>-8</sup> Pa (20 °C) 2.0 x 10 <sup>-7</sup> Pa (25 °C) extrapolated from measurements between 80 °C and 160 °C.	not acceptable (DAR) purity of isomer II too low	N	Sewekow, 1981 (LUF9400267)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
Volatility (Henry's Law constant)	Calculation	beta-cyfluthrin isomer II	$9.3 \times 10^{-2} \text{ Pa m}^3 \text{ mol}^{-1}$ (20 °C)	acceptable	N	Ziemer (2013) (BVL no. 2632861)
	Calculation	beta-cyfluthrin isomer IV	$0.6 \text{ Pa m}^3 \text{ mol}^{-1}$ (20 °C)	acceptable	N	Ziemer (2013) (BVL no. 2632862)
	Calculation	isomer II isomer IV	$2.9 \times 10^{-3} \text{ Pa m}^3 \text{ mol}^{-1}$ $3.1 \times 10^{-2} \text{ Pa m}^3 \text{ mol}^{-1}$	not acceptable (DAR) vapour pressure used for calculation is not acceptable (s. above)	N	Krohn, 1992 (WAS9400153)
<b>B.2.3 Appearance (physical state, colour) (CA 2.3)</b>						
Appearance (physical state, colour)	Visual assessment	99.4 % (beta-cyfluthrin isomer II)	white powder	acceptable	Y	Ziemer, Strunk (2013) (BVL no. 2632867)
	Visual assessment	99.2 % (beta-cyfluthrin isomer IV)	white powder	acceptable	Y	Ziemer, Strunk (2013) (BVL no. 2632868)
	Visual assessment	TAS: 99.1 % (beta-cyfluthrin)	white powder	acceptable	Y	Ziemer, Strunk (2013) (BVL no. 2632869)
	Visual assessment	Both Isomers TAS	Colourless crystals White powder	acceptable (DAR)	N	Summary

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
<b>B.2.4 Spectra (UV/VIS, IR, NMR, MS), molar extinction at relevant wavelengths, optical purity (CA 2.4)</b>						
Spectra (UV/VIS, IR, NMR, MS), molar extinction at relevant wavelengths, optical purity	UV-VIS OECD 101	99.3 % (beta-cyfluthrin isomer II)	$\lambda_{\max}$ [nm] $\epsilon$ [L mol <sup>-1</sup> cm <sup>-1</sup> ]    pH 204                    41366            neutral 269                    2129            neutral 276                    2008            neutral 291                    80                neutral  203                    44498            acidic 269                    2129            acidic 276                    2008            acidic 291                    80                acidic  220                    29639            basic 295                    1486            basic	acceptable	Y	Doerner-Rieping (2013) (BVL no. 2632870)
	UV-VIS OECD 101	99.2 % (beta-cyfluthrin isomer IV)	$\lambda_{\max}$ [nm] $\epsilon$ [L mol <sup>-1</sup> cm <sup>-1</sup> ]    pH 204                    42545            neutral 269                    2127            neutral 276                    2000            neutral 291                    85                neutral  204                    42503            acidic 269                    2042            acidic 276                    1957            acidic 291                    43                acidic  219                    28888            basic 294                    1617            basic	acceptable	Y	Doerner-Rieping (2013) (BVL no. 2632871)



Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
	UV	974 g/kg (Isomer II)  989 g/kg (Isomer IV)	UV (methanol)	not acceptable (DAR) No data for molar extinction provided.	N	Krohn, Sieveking (1985) (CHE9400413)
	IR, NMR, MS	99.3 % (beta- cyfluthrin isomer II)	Spectra are consistent with given structure of beta- cyfluthrin isomer II.	Additional, acceptable	Y	Doerner-Rieping (2013) (BVL no. 2632870)
	IR, NMR, MS	99.2 % (beta- cyfluthrin isomer IV)	Spectra are consistent with given structure of beta- cyfluthrin isomer IV.	Additional, acceptable	Y	Doerner-Rieping (2013) (BVL no. 2632871)
	IR, NMR, MS	974 g/kg (Isomer II)  989 g/kg (Isomer IV)	IR (KBr) <sup>1</sup> H-NMR (250 MHz, CDCl <sub>3</sub> ) <sup>13</sup> C-NMR (62.89 MHz, CDCl <sub>3</sub> ) Mass spectra (electron impulse)	acceptable (DAR)	N	Krohn, Sieveking (1985) (CHE9400413)
Spectra for impurities	UV-VIS, IR, NMR, MS		No toxicologically, ecotoxicologically or environmentally significant components.			
<b>B.2.5 Solubility in water (CA 2.5)</b>						
Solubility in water	EC A 6 (column elution method)	99.4 % (beta- cyfluthrin isomer II)	2.1 µg/L at 20 °C (pH 6.4)	acceptable	Y	Sonnenschein (2013) (BVL no. 2632872)
	EC A 6 (column elution method)	99.2 % (beta- cyfluthrin isomer IV)	1.6 µg/L at 20 °C (pH 6.4)	acceptable	Y	Sonnenschein (2013) (BVL no. 2632873)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
	OECD 105 (column elution method)	97.5 %	Isomer II: 2.1 µg/L (20 °C; demin. water) Isomer IV: 1.2 µg/L (20 °C; demin. water)	not acceptable (DAR) The standard deviation of the determined solubility of Isomer IV is too high (RSD = 80%)	N	Krohn, 1988 (CHE9500326)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
<b>B.2.6 Solubility in organic solvents (CA 2.6)</b>						
Solubility in organic solvents	Comparable to OECD 105	99.3 % (cyfluthrin isomer II)	<u>Isomer II:</u> acetone > 250 acetonitrile > 250 dichloromethane > 250 dimethylsulfoxide > 250 ethylacetate > 250 n-heptane 3.2 1-octanol 7.1 polyethyleneglycol 55 2-propanol 9.3 xylene > 250 all values in g/L at 20 °C	acceptable	Y	Gruener (2001) (BVL no. 2632876)
		98.9 % (cyfluthrin isomer IV)	<u>Isomer IV:</u> acetone > 250 acetonitrile 81 dichloromethane > 250 dimethylsulfoxide 204 ethylacetate > 250 n-heptane 1.2 1-octanol 2.8 polyethyleneglycol 27 2-propanol 4.3 xylene 103 all values in g/L at 20 °C			
	Inhouse method (comparable to CIPAC Method MT181)	> 98 % (II) > 98 % (IV)	<div>Isomer II</div> dichlormethane > 200 n-hexane 10 – 20 2-propanol 5 – 10 toluene > 200 all values in g/L at 20 °C <div>Isomer IV</div> > 200 1 – 2 2 – 5 100 – 200	Not acceptable (DAR) Not all of the required solvents were analysed.	N	Krohn, 1994 (CHE9500323)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
<b>B.2.7 Partition coefficient n-octanol/water (CA 2.7)</b>						
Partition coefficient n-octanol/water	EC A 8 (HPLC method)	99.4 % (beta-cyfluthrin isomer II)	$\log P_{o/w} = 5.9$ (25 °C; pH 5.6)	acceptable	Y	Wiche, Peschke, Ziemer (2013) (BVL no. 2632877)
	EC A 8 (HPLC method)	99.2 % (beta-cyfluthrin isomer IV)	$\log P_{o/w} = 5.8$ (25 °C; pH 5.6)	acceptable	Y	Wiche, Peschke, Ziemer (2013) (BVL no. 2632878)
	EEC A 8 OECD 107 (shake flask method)	97.5	Isomer II: $\log P_{o/w} = 6.18$ (22 °C) Isomer IV: $\log P_{o/w} = 6.18$ (22 °C)	not acceptable (DAR) $\log P_{o/w}$ outside the recommended pH-range for the shake flask method	N	Krohn, 1988 (CHE9500327)
	EC A 8 (shake flask method)	99.2 % (metabolite FPB acid, AE F105561)	$\log P_{o/w} = 2.6$ (23 °C; pH 5) $\log P_{o/w} = 0.8$ (23 °C; pH 7) $\log P_{o/w} = -0.5$ (23 °C; pH 9)	acceptable	Y	Ziemer, Kloeckner (2012) (BVL no 2632879)
	EC A 8 (shake flask method)	99.1 % cis/trans ratio: 51.4 %/48.6 % (metabolite DCV A (permethric acid, AE 0433590))	<u>trans-permethric acid:</u> $\log P_{o/w} = 2.5$ (25 °C; pH 5) $\log P_{o/w} = 0.8$ (25 °C; pH 7) $\log P_{o/w} = -0.8$ (25 °C; pH 9)  <u>cis-permethric acid:</u> $\log P_{o/w} = 3.0$ (25 °C; pH 5) $\log P_{o/w} = 1.3$ (25 °C; pH 7) $\log P_{o/w} = -0.4$ (25 °C; pH 9)	acceptable	Y	Ziemer, Charter (2012) (BVL no. 2632880)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
<b>B.2.8      Dissociation in water (CA 2.8)</b>						
Dissociation constant	Statement	beta-cyfluthrin	Not applicable; the substance does not have acid or alkaline properties.	acceptable (DAR)	N	Krohn (1994) (WAS9500172)
	Statement	beta-cyfluthrin isomer II	Based on the chemical structure beta-cyfluthrin isomer II does not dissociate.	additional acceptable	N	Ziemer (2013) (BVL no. 2632881)
	Statement	beta-cyfluthrin isomer IV	Based on the chemical structure beta-cyfluthrin isomer IV does not dissociate.	additional acceptable	N	Ziemer (2013) (BVL no. 2632882)
<b>B.2.9      Flammability and self-heating (CA 2.9)</b>						
Flammability	EC A 10	TAS: 99.1 % (beta-cyfluthrin)	Beta-cyfluthrin technical is not flammable.	acceptable	Y	Smeykal (2013) (BVL no. 2632284)
			not flammable	not acceptable (DAR) Only information from MSDS	N	Anonymous, 1994 (CHE9500320)
Self-heating	EC A 16	TAS 98.8 %	Negative, no exothermic reaction up to 400 °C.	acceptable (DAR)	Y	Mix (1995) (CHE9500328)
	VDI guideline 2263, sheet 1	TAS: 99.1 % (beta-cyfluthrin)	No self-ignition up to 440 °C.	additional acceptable	Y	Smeykal (2013) (BVL no. 2632285)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
<b>B.2.10 Flash point (CA 2.10)</b>						
Flash point			Not applicable – material does not have a melting point below 40 °C.			
<b>B.2.11 Explosive properties (CA 2.11)</b>						
Explosive properties	EC A 14	TAS 98.8 %	Beta-cyfluthrin technical is neither explosive when heated in a closed tube, nor is it sensitive to shock, nor to friction.	acceptable (DAR)	Y	Mix (1995) (CHE9500328)
<b>B.2.12 Surface tension (CA 2.12)</b>						
Surface tension	Statement	beta-cyfluthrin	Not applicable - water solubility of the test item is lower than 1 mg/L.	additional acceptable	N	Ziemer (2013) (BVL no. 2632886)
<b>B.2.13 Oxidising properties (CA 2.13)</b>						
Oxidising properties	EC A 17	TAS: 99.1 % (beta-cyfluthrin)	Beta-cyfluthrin technical has no oxidizing properties.	acceptable	Y	Smeykal (2013) (BVL no. 2632887)

Study	Method	Purity [%]	Results	Conclusion/ Comment	GLP	Reference
	Statement		Not applicable. The examination of the chemical structure of beta-cyfluthrin establishes that the active substance is incapable of reaction exothermically with a combustible material.	not acceptable (DAR) No structure analysis according to UN recommendations		
<b>B.2.14 Other studies</b>						
Relative density	EC A 3 OECD 109 (air comparison pycnometer)	99.4 % (beta-cyfluthrin isomer II)	$D_4^{20} = 1.35$ at 20°C	Additional acceptable	Y	Ziemer, Strunk (2013) (BVL no. 2632888)
Relative density	EC A 3 OECD 109 (air comparison pycnometer)	99.2 % (beta-cyfluthrin isomer IV)	$D_4^{20} = 1.32$ at 20°C	Additional acceptable	Y	Ziemer, Strunk (2013) (BVL no. 2632889)
Relative density	EC A 3 OECD 109 (air comparison pycnometer)	TAS: 98.7 % (beta-cyfluthrin)	$D_4^{20} = 1.35$ at 20°C	Additional acceptable	Y	Wiche, Strunk (2007) (BVL no. 2632890)

No logPow has been determined for the metabolite FPB-aldehyde which is included in the definition of residues in the environment requiring further assessment for sediment. However, this metabolite is not formed in soil, but in surface water bodies only. Thus, no run-off/drainage scenario has to be considered in terms of the aquatic risk assessment. As the parameter logPow is only necessary for modelling the exposure of surface water via run-off/drainage (important entry of soil metabolites) and FPB-aldehyde is not formed in soil, data on the logPow of FPB-aldehyde are not considered necessary for the ecotoxicological risk assessment.

The following new studies have been provided for the determination of the pH of the active substance and the isomers II and IV but are not required according to Regulation (EU) No 283/2013 for this section and have therefore not been evaluated:

- Ziemer, Strunk (2013), AE 1421342 (beta-cyfluthrin isomer II): Determination of the pH-value in distilled water, M-445764-01-1
- Ziemer, Strunk (2013), AE 1421344 (beta-cyfluthrin isomer IV): Determination of the pH-value in distilled water, M-446145-01-1

- Wiche, Bogdoll (2007), Determination of the pH-value of beta-cyfluthrin (AE 1430672), technical substance, M-293726-01-1

The following new studies have been provided for the metabolites DCV (A) und FPB acid but are not required according to Regulation (EU) No 283/2013 for this section and have therefore not been evaluated:

- Smeykal (2012), AE F105561: Vapour pressure, M-436959-01-1
- Smeykal (2012), AE 0433590: Vapour pressure, M-436960-01-1
- Ziemer (2012), AE F105561: Calculation of the Henry's law constants, M-439562-01-1
- Ziemer (2012), AE 0433590: Calculation of the Henry's law constants, M-439445-01-1
- Ziemer, Kloeckner (2012), AE F105561: Water solubility at pH 5, pH 7 and pH 9 (flask method), M-435953-01-1
- Wiche, Ziemer (2012), AE 0433590: Water solubility at pH 5, pH 7 and pH 9 (flask method), M-438162-01-1
- Eyrich, Ziemer (2012), AE 0433590: Dissociation constant in water, M-439052-01-1
- Eyrich, Ziemer (2012), AE F105561: Dissociation constant in water, M-436668-01-1

### Summary

Beta-cyfluthrin is an odourless white powder with a melting range of 82 – 96°C (PAI). Its decomposition starts at 210°C. The vapour pressure of the active substance is  $4.5 \times 10^{-7}$  Pa (Isomer II) and  $2.2 \times 10^{-6}$  Pa (Isomer IV) at 20°C. The substance as manufactured is neither flammable nor self-heating and it has no explosion or oxidizing properties. Beta-cyfluthrin has a low water solubility, i.e. 2.1 µg/L (Isomer II) and 1.6 µg/L (Isomer IV) at 20°C. It does not dissociate in water. Its partition in n-octanol / water is 5.9 (Isomer II) / 5.8 (Isomer IV) in logarithmic units.



## B.2.15 References relied on

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not BVL registration number	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner
KCA 2.1 /01	Krohn, J.	1984	Purity test, melting point - Cyfluthrin Bayer AG, Leverkusen, Germany Bayer CropScience, Report No.: PC 180, Edition Number: M-043015-01-1 Date: 1984-04-02 GLP/GEP: no, unpublished CHE 9400403	N	N		Bayer CropScience
KCA 2.1 /03	Smeykal, H.	2012	AE 1421342 (beta-cyfluthrin isomer II): Melting point, boiling point, thermal stability Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120272.01, Edition Number: M-441187-01-1 Date: 2012-11-05 GLP/GEP: yes, unpublished 2632855	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.1 /04	Smeykal, H.	2012	AE 1421344 (beta-cyfluthrin isomer IV): Melting point, boiling point, thermal stability Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120273.01, Edition Number: M-441179-01-1 Date: 2012-11-05 GLP/GEP: yes, unpublished 2632856	N	Y	old studies were performed with cyfluthrin	BCS-Irvita

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<b>Annex point / reference number</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not BVL registration number</b>	<b>Vertebrate study Y/N</b>	<b>Data protection claimed Y/N</b>	<b>Justification if data protection is claimed</b>	<b>Owner</b>
KCA 2.1 /05	Smeykal, H.	2007	Beta-Cyfluthrin ( FCR4545 / AE 1430672 ), technical substance - Melting point A.1. (OECD 102) - Boiling point A.2. (OECD 103) - Thermal stability (OECD 113) Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20071002.01, Edition Number: M-293870-01-1 Date: 2007-10-25 GLP/GEP: yes, unpublished 2632857	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.1 /06	Smeykal, H.	2007	Beta-Cyfluthrin ( FCR4545 / AE 1430672 ), pure substance - Melting point A.1. (OECD 102) - Boiling point A.2. (OECD 103) - Thermal stability (OECD 113) Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20071001.01, Edition Number: M-293869-01-1 Date: 2007-10-25 GLP/GEP: yes, unpublished 2632858	N	Y	new study according to current guidelines	BCS-Irvita
KCA 2.2 /03	Smeykal, H.	2012	AE 1421342 (beta-cyfluthrin isomer II): Vapour pressure Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120272.02, Edition Number: M-441180-01-1 Date: 2012-11-05 GLP/GEP: yes, unpublished 2632859	N	Y	new study according to current guidelines	BCS-Irvita

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<b>Annex point / reference num- ber</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not BVL registration number</b>	<b>Verte- brate study Y/N</b>	<b>Data protection claimed Y/N</b>	<b>Justification if data protection is claimed</b>	<b>Owner</b>
KCA 2.2 /04	Smeykal, H.	2012	AE 1421344 (beta-cyfluthrin isomer IV): Vapour pres- sure Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120273.02, Edition Number: M-441178-01-1 Date: 2012-11-05 GLP/GEP: yes, unpublished 2632860	N	Y	new study ac- cording to cur- rent guidelines	BCS-Irvita
KCA 2.2 /05	Ziemer, F.	2013	AE 1421342 (beta-cyfluthrin isomer II): Calculation of the Henry's law constant BCS-Irvita, Report No.: AF13/020, Edition Number: M-470833-01-1 Date: 2013-11-22 GLP/GEP: no, unpublished 2632861	N	Y		BCS-Irvita
KCA 2.2 /06	Ziemer, F.	2013	AE 1421344 (beta-cyfluthrin isomer IV): Calculation of the Henry's law constant BCS-Irvita, Report No.: AF12/059, Edition Number: M-470836-01-1 Date: 2013-11-22 GLP/GEP: no, unpublished 2632862	N	Y		BCS-Irvita

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KCA 2.3 /01	Ziemer, F.; Strunk, B.	2013	AE 1421342 (beta-cyfluthrin isomer II): Physical characteristics colour, physical state and odour BCS-Irvita, Report No.: PA12/106, Edition Number: M-445765-01-1 Date: 2013-01-30 GLP/GEP: yes, unpublished 2632867	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.3 /02	Ziemer, F.; Strunk, B.	2013	AE 1421344 (beta-cyfluthrin isomer IV): Physical characteristics colour, physical state and odour BCS-Irvita, Report No.: PA12/109, Edition Number: M-446060-01-1 Date: 2013-01-31 GLP/GEP: yes, unpublished 2632868	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.3 /03	Ziemer, F.; Strunk, B.	2013	Beta-cyfluthrin (AE 1430672), technical substance: Physical characteristics colour, physical state and odour BCS-Irvita, Report No.: PA12/112, Edition Number: M-446061-01-1 Date: 2013-01-31 GLP/GEP: yes, unpublished 2632869	N	Y	old studies were performed with cyfluthrin	BCS-Irvita

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KCA 2.4 /01	Krohn, J.	1985	Cyfluthrin - Spectra of the diastereomers of the active ingredient Bayer AG, Wuppertal, Germany Bayer CropScience, Report No.: PC2037, Edition Number: M-004852-01-2 Date: 1985-03-29 GLP/GEP: no, unpublished CHE 9400413	N	N		Bayer CropScience
KCA 2.4 /02	Doerner-Rieping, S.	2013	Spectral data (UV / VIS, IR, 1H-NMR, 13C-NMR, MS) and molar extinction coefficients of beta-cyfluthrin isomer II (AE 1421342) BCS-Irvita, Report No.: PA13/017, Edition Number: M-466642-01-1 Date: 2013-10-11 GLP/GEP: yes, unpublished 2632870	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.4 /03	Doerner-Rieping, S.	2013	Spectral data (UV / VIS, IR, 1H-NMR, 13C-NMR, MS) and molar extinction coefficients of beta-Cyfluthrin Isomer IV (AE 1421344) BCS-Irvita, Report No.: PA13/018, Edition Number: M-466915-01-1 Date: 2013-10-11 GLP/GEP: yes, unpublished 2632871	N	Y	old studies were performed with cyfluthrin	BCS-Irvita

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KCA 2.5 /02	Sonnenschein, L.	2012	AE 1421342 (beta-Cyfluthrin isomer II): Solubility in distilled water (column elution method) Allessa Chemie GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: B 037/2013, Edition Number: M-470002-01-1 Date: 2012-11-06 GLP/GEP: yes, unpublished 2632872	N	Y	old studies were performed with cyfluthrin	Bayer CropScience
KCA 2.5 /03	Sonnenschein, L.	2013	AE 1421344 (beta-Cyfluthrin isomer IV): Solubility in distilled water (column elution method) Allessa Chemie GmbH, Frankfurt am Main, Germany BCS-Irvita, Report No.: B 038/2013, Edition Number: M-470008-01-1 Date: 2013-11-11 GLP/GEP: yes, unpublished 2632873	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.6 /02	Gruener, R.	2001	Solubility in Representative Organic Solvents of Cyfluthrin (FCR 1272) ( Diastereomer 1, Diastereomer 2, Diastereomer 3 and Diastereomer 4) Bayer AG, Leverkusen, Germany Bayer CropScience, Report No.: 1400421024, Edition Number: M-030576-01-1 Date: 2001-05-16 GLP/GEP: yes, unpublished 2632876	N	Y	new study according to current guidelines	Bayer Crop-Science, owner Bayer Crop-Science, license Irvita Plant Protection B.V.

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KCA 2.7 /02	Wiche, A.; Peschke, C.; Ziemer, F.	2013	AE 1421342 (beta-cyfluthrin isomer II): Partition coefficient 1-octanol / water (HPLC method) BCS-Irvita, Report No.: PA12/101, Edition Number: M-447653-01-1 Date: 2013-01-29 GLP/GEP: yes, unpublished 2632877	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.7 /03	Wiche, A.; Peschke, C.; Ziemer, F.	2013	AE 1421344 (beta-cyfluthrin isomer IV): Partition coefficient 1-octanol / water (HPLC method) BCS-Irvita, Report No.: PA12/102, Edition Number: M-447649-01-1 Date: 2013-01-29 GLP/GEP: yes, unpublished 2632878	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.7 /04	Ziemer, F.; Kloeckner, C.	2012	AE F105561: Partition coefficients 1-octanol / water at pH 5, pH 7 and pH 9 (shake flask method) BCS-Irvita, Report No.: PA12/036, Edition Number: M-435955-01-1 Date: 2012-08-01 GLP/GEP: yes, unpublished 2632879	N	Y	new study according to current requirements	BCS-Irvita

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KCA 2.7 /05	Ziemer, F.; Charter, G. E.	2012	AE 0433590: Partition coefficients 1-octanol / water at pH 5, pH 7 and pH 9 (shake flask method) BCS-Irvita, Report No.: PA12/046, Edition Number: M-438168-01-1 Date: 2012-09-13 GLP/GEP: yes, unpublished 2632880	N	Y	new study according to current guidelines	BCS-Irvita
KCA 2.8 /11	Krohn, J.	1994	Dissociation constant of FCR 4545 Bayer AG, Leverkusen, Germany Bayer CropScience, Report No.: PC473, Edition Number: M-011417-01-1 Date: 1994-11-24 GLP/GEP: no, unpublished WAS 9500172	N	N		Bayer CropScience
KCA 2.8 /12	Ziemer, F.	2013	AE 1421342 (beta-cyfluthrin isomer II): Statement on the dissociation constant BCS-Irvita, Report No.: AF13/021, Edition Number: M-471491-01-1 Date: 2013-11-18 GLP/GEP: no, unpublished 2632881	N	Y		BCS-Irvita

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KCA 2.8 /13	Ziemer, F.	2013	AE 1421344 (beta-cyfluthrin isomer IV): Statement on the dissociation constant BCS-Irvita, Report No.: AF13/022, Edition Number: M-471486-01-1 Date: 2013-08-09 GLP/GEP: no, unpublished 2632882	N	Y		BCS-Irvita
KCA 2.9 /02	Mix, K. H.	1995	Determination of safety-relevant parameters of FCR 4545 (Bulldock techn.) Bayer AG, Leverkusen, Germany Bayer CropScience, Report No.: PC669, Edition Number: M-011533-01-2 Date: 1995-01-17 GLP/GEP: yes, unpublished CHE 9500328	N	N		Bayer CropScience
KCA 2.9 /03	Smeykal, H.	2013	Beta-cyfluthrin (FCR4545, AE 1430672), technical substance: Flammability (solids) Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120291.01, Edition Number: M-445106-01-1 Date: 2013-01-18 GLP/GEP: yes, unpublished 2632884	N	Y	old studies were performed with cyfluthrin	BCS-Irvita

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KCA 2.9 /04	Smeykal, H.	2013	Beta-cyfluthrin (FCR4545, AE 1430672), technical substance: Auto - flammability (solids - determination of relative self-ignition temperature) (Grewer-oven) Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120291.03, Edition Number: M-445111-01-1 Date: 2013-01-18 GLP/GEP: yes, unpublished 2632885	N	Y	old studies were performed with cyfluthrin	BCS-Irvita
KCA 2.11 /01	Mix, K. H.	1995	Determination of safety-relevant parameters of FCR 4545 (Bulldock techn.) Bayer AG, Leverkusen, Germany Bayer CropScience, Report No.: PC669, Edition Number: M-011533-01-2 Date: 1995-01-17 GLP/GEP: yes, unpublished CHE 9500328	N	N		Bayer CropScience
KCA 2.12 /02	Ziemer, F.	2013	Beta-cyfluthrin (FCR4545, AE 1430672): Statement on the surface tension BCS-Irvita, Report No.: AF13/023, Edition Number: M-471494-01-1 Date: 2013-11-18 GLP/GEP: no, unpublished 2632886	N	Y		BCS-Irvita

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KCA 2.13 /01	Smeykal, H.	2013	Beta-cyfluthrin (FCR4545, AE 1430672), technical substance: Oxidizing properties Siemens AG, Frankfurt am Main, Germany BCS-Irvita, Report No.: 20120291.02, Edition Number: M-445108-01-1 Date: 2013-01-18 GLP/GEP: yes, unpublished 2632887	N	Y	old studies were performed with cyfluthrin	BCS-Irvita

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