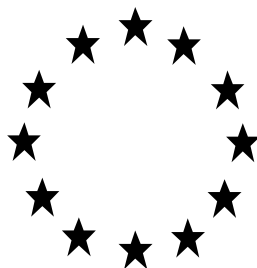


Draft Renewal Assessment Report  
under Regulation (EC) 1107/2009



**CLOPYRALID**

**Volume 3 – B.2 (AS)**

RMS: Finland  
Co-RMS: Poland

May 2017

## Volume 1

**Level 1: Statement of subject matter and purpose for which this report has been prepared and background information on the application**

**Level 2: Summary of active substance hazard and of product risk assessment**

**Level 3: Proposed decision with respect to the application**

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Appendix 2: Reference list

## Volume 2

**Annex A: List of the tests, studies and information submitted**

## Volume 3

**Annex B (Active Substance): Summary, evaluation and assessment of the data and information**

Annex B.1 (AS): Identity

**Annex B.2 (AS): Physical and chemical properties of the active substance**

Annex B.3 (AS): Data on application

Annex B.4 (AS): Further information

Annex B.5 (AS): Methods of analysis

Annex B.6 (AS): Toxicology and metabolism data

Annex B.7 (AS): Residue data

Annex B.8 (AS): Environmental fate and behaviour

Annex B.9 (AS): Ecotoxicology data

## Volume 3

**Annex B (Plant Protection Product): Summary, evaluation and assessment of the data and information**

Annex B.1 (PPP): Identity

Annex B.2 (PPP): Physical and chemical properties of the plant protection product

Annex B.3 (PPP): Data on application and efficacy

Annex B.4 (PPP): Further information

Annex B.5 (PPP): Methods of analysis

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Annex B.7 (PPP): Residue data

Annex B.8 (PPP): Environmental fate and behaviour and environmental exposure assessment

Annex B.9 (PPP): Ecotoxicology data and assessment of risks for non-target species

## Volume 4

**Annex C: Confidential information and, where relevant, details of any task force formed for the purpose of generating tests and studies submitted**

## List of Endpoints

## Version History

When	What
2017/May	DRAR- First version submitted to EFSA

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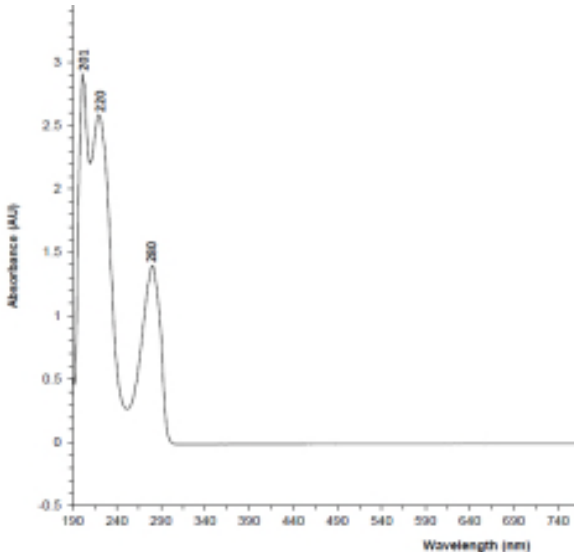
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**B.2. PHYSICAL AND CHEMICAL PROPERTIES OF THE ACTIVE SUBSTANCE**

Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference
<b>B.2.1. MELTING POINT AND BOILING POINT</b>						
Melting, freezing or solidification point B.2.1/01	EEC Method A1	clopyralid (99.8%)	Melting Point: $149.6 \pm 0.2$ °C	Acceptable.	Yes	FAPC023323, Madsen, S. S. , 2002
Boiling point B.2.1/02	EEC Method A2; OECD 103	clopyralid (99.8%)	Clopyralid was determined to decompose at $164 \pm 2$ °C by Differential Scanning Calorimeter (DSC) analysis. A thermal effect due to boiling was not observed.	Acceptable.	Yes	FAPC033231, Madsen, S.S., 2003
Decomposition Sublimation temperature B.2.1/03	/ EEC Method A2; OECD 103	clopyralid (99.8%)	Clopyralid was determined to decompose at $164 \pm 2$ °C by Differential Scanning Calorimeter (DSC) analysis.	Acceptable.	Yes	FAPC033231, Madsen, S. S., 2003
<b>B.2.2. VAPOUR PRESSURE, VOLATILITY</b>						
Vapour pressure B.2.2/01	EEC Method A4; OECD 104	clopyralid (99.6%)	$1.02 \times 10^{-5}$ mmHg or $1.36 \times 10^{-6}$ kPa at 25°C	Acceptable.	Yes	ML-AL 91-020325, Srivastava, R. ; Chakrabarti, A. ; Griffin, K. A. , 1991

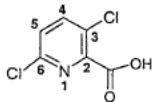
Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results		Comments (Acceptable / Non acceptable)	GLP	Reference
Volatility (Henry’s Law constant) B.2.2/02	Calculation	clopyralid (99.2% for water solubility; 99.6% for vapour pressure)			Acceptable.	No	NAFST238, Swayze, K. M. , 2000
			pH	Henry’s Law Constant (Pa m <sup>3</sup> /mol) at 20°C			
			Unbuffered	3.28 x 10 <sup>-10</sup>			
			5	2.18 x 10 <sup>-11</sup>			
			7	1.80 x 10 <sup>-11</sup>			
			9	1.64 x 10 <sup>-11</sup>			
B.2.3. APPEARANCE (PHYSICAL STATE, COLOUR)							
Physical state and colour B.2.3/01	Visual	clopyralid (95.3%)	As manufactured: Color - Cream Physical State - Powdery Solid		Acceptable.	Yes	GH-C 2471, Fore, D. W. ; Hamilton, T. D. , 1991
	Visual	clopyralid (99.8%)	Pure Active Ingredient: Color - White Physical State - Crystalline Solid		Acceptable.	Yes	FAPC023323, Madsen, S. S. , 2002
B.2.4. SPECTRA (UV/VIS, IR, NMR, MS), MOLAR EXTINCTION AT RELEVANT WAVELENGTHS, OPTICAL PURITY							
Ultraviolet/visible (UV/VIS) B.2.4/01	OECD 101	clopyralid (99.9%)	pH      concentration: absorbance maxima (λmax)  <2      19.4-µg/mL: 201, 226, and ~282 nm 58.3-µg/mL: 206, 223, and 282 nm  7      19.4-µg/mL: 198, 221, and 280 nm 58.3-µg/mL: 202, 220, and 280 nm  >10      19.4-µg/mL: 199, 221, and 280 nm 58.3-µg/mL: 203, 219, and 280 nm  The blank versus blank scans showed no absorbance readings varying		Acceptable.  According to the <b>REGULATION (EU) No 283/2013</b> ,  a) If the Ultraviolet/ visible molar extinction/ absorption coefficient of the active substance is less than 10 l mol <sup>-1</sup> cm <sup>-1</sup> , no	Yes	NAFST-14-91, Elliott, T. , 2014

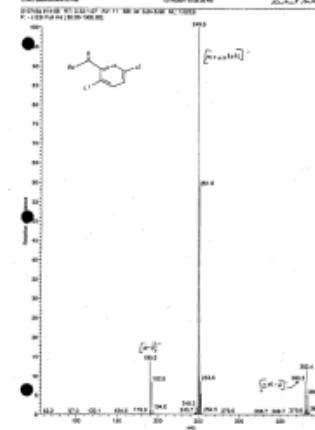
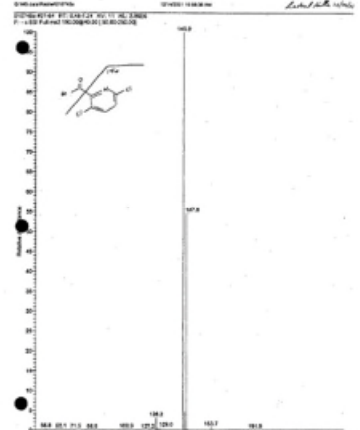
Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference																																																																
			<p>more than ±0.05 from the nominal zero value.</p> <p>Molar Extinction:</p> <table><tr><th>pH</th><th>Concentration (µg/mL )</th><th>ε (L mol<sup>-1</sup> cm<sup>-1</sup>)</th><th>λ (nm)</th></tr><tr><td rowspan="4">&lt;2</td><td rowspan="4">19.4</td><td>19468</td><td>201</td></tr><tr><td>8771</td><td>226</td></tr><tr><td>3609</td><td>282</td></tr><tr><td><b>2777</b></td><td><b>290</b></td></tr><tr><td rowspan="4">&lt;2</td><td rowspan="4">58.3</td><td>11247</td><td>206</td></tr><tr><td>8263</td><td>223</td></tr><tr><td>3614</td><td>282</td></tr><tr><td><b>2820</b></td><td><b>290</b></td></tr><tr><td rowspan="4">7</td><td rowspan="4">19.4</td><td>16355</td><td>198</td></tr><tr><td>8951</td><td>221</td></tr><tr><td>4640</td><td>280</td></tr><tr><td><b>2832</b></td><td><b>290</b></td></tr><tr><td rowspan="4">7</td><td rowspan="4">58.3</td><td>9581</td><td>202</td></tr><tr><td>8533</td><td>220</td></tr><tr><td>4592</td><td>280</td></tr><tr><td><b>2875</b></td><td><b>290</b></td></tr><tr><td rowspan="4">&gt;10</td><td rowspan="4">19.4</td><td>15262</td><td>199</td></tr><tr><td>9395</td><td>221</td></tr><tr><td>4904</td><td>280</td></tr><tr><td><b>3072</b></td><td><b>290</b></td></tr><tr><td rowspan="4">&gt;10</td><td rowspan="4">58.3</td><td>9695</td><td>203</td></tr><tr><td>8884</td><td>219</td></tr><tr><td>4788</td><td>280</td></tr><tr><td><b>3019</b></td><td><b>290</b></td></tr></table>	pH	Concentration (µg/mL )	ε (L mol <sup>-1</sup> cm <sup>-1</sup> )	λ (nm)	<2	19.4	19468	201	8771	226	3609	282	<b>2777</b>	<b>290</b>	<2	58.3	11247	206	8263	223	3614	282	<b>2820</b>	<b>290</b>	7	19.4	16355	198	8951	221	4640	280	<b>2832</b>	<b>290</b>	7	58.3	9581	202	8533	220	4592	280	<b>2875</b>	<b>290</b>	>10	19.4	15262	199	9395	221	4904	280	<b>3072</b>	<b>290</b>	>10	58.3	9695	203	8884	219	4788	280	<b>3019</b>	<b>290</b>	<p><b>phototoxicity</b> testing is required.</p> <p>Here ε &gt; 10 l mol<sup>-1</sup>cm<sup>-1</sup>.</p> <p><b>b)</b> If the Ultraviolet/ visible molar extinction/ absorption coefficient of the active substance and its major metabolites is less than 1000 l mol<sup>-1</sup>cm<sup>-1</sup>, <b>photomutagenicity</b> testing is not required.</p> <p>Here ε &gt; 1000 l mol<sup>-1</sup>cm<sup>-1</sup>.</p> <p><b>According to the applicant</b>, a phototoxicity study with clopyralid is not necessary for following reasons:</p> <p>-Molar absorption co-efficient of clopyralid was found to be below trigger values for wavelength range 313 and 700 nm. Wave length between 290-312 nm is UVB which is highly cytotoxic and can't be used in the only available phototoxicity test guideline OECD 432.</p> <p>-Additionally, clopyralid was found be stable in aqueous and soil photolysis studies where the light wavelength used cover the range of 290-700 nm.</p>		
pH	Concentration (µg/mL )	ε (L mol <sup>-1</sup> cm <sup>-1</sup> )	λ (nm)																																																																			
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Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference												
			<p>Representative UV/VIS spectrum of 58.3-µg/mL clopyralid in neutral (pH=7) solution:</p> 	<p>There was no photo-degradation observed of any phototoxicity concern for humans.</p> <p>-Clopyralid itself was tested for eye and skin irritation and found to be positive for eye irritation.</p> <p>-PPE used for eye irritation would be sufficient to cover any uncertainty for phototoxicity.</p> <p>-A phototoxicity study, if to conducted, wouldn't expect to provide any new information.</p>														
	OECD 101	clopyralid (99.8%)	<table><thead><tr><th></th><th>Absorption maxima (nm)</th><th>ε (l/mol cm)</th></tr></thead><tbody><tr><td>Unbuffered (pH~4)</td><td>193, 220, 280</td><td>22100, 9200, 4790</td></tr><tr><td>pH &lt;2</td><td>202, 225, 281</td><td>16200, 8890, 3800</td></tr><tr><td>pH &gt;10</td><td>220, 279</td><td>9300, 5030</td></tr></tbody></table>		Absorption maxima (nm)	ε (l/mol cm)	Unbuffered (pH~4)	193, 220, 280	22100, 9200, 4790	pH <2	202, 225, 281	16200, 8890, 3800	pH >10	220, 279	9300, 5030	<p>The study in question is in the original DAR and is replaced by better quality UV spectra (ref. Elliott 2014).</p>	Yes	FAPC013343, Madsen, S.; Bridges, J. ; Cooper, D. Godbey, J.; Miller, R., 2002
	Absorption maxima (nm)	ε (l/mol cm)																
Unbuffered (pH~4)	193, 220, 280	22100, 9200, 4790																
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Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference																																
Infrared (IR) B.2.4/02	OECD 101	clopyralid (99.8%)	<div>IR spectrum of clopyralid was consistent with the structure of clopyralid.</div> <div><table><tr><th>Wavenumber (cm<sup>-1</sup>)</th><th>Assignment</th></tr><tr><td>1706.6</td><td>C=O stretch</td></tr><tr><td>1564.7</td><td>—</td></tr><tr><td>1444.0</td><td>—</td></tr><tr><td>1349.3</td><td>—</td></tr><tr><td>1309.2</td><td>—</td></tr><tr><td>1233.0</td><td>—</td></tr><tr><td>1139.9</td><td>—</td></tr></table></div> <div>As only one of the bands has been assigned, the applicant has later provided the assignments of the other bands:</div> <div><table><tr><th>Wavenumber (cm<sup>-1</sup>)</th><th>Assignment</th></tr><tr><td>1706.6</td><td>C=O stretch</td></tr><tr><td>1564.7</td><td>Aromatic ring stretch</td></tr><tr><td>1444.0</td><td>C-H bend</td></tr><tr><td>1349.3</td><td>C-H bend</td></tr><tr><td>1309.2</td><td>C-O stretch</td></tr><tr><td>1233.0</td><td>C-H bend</td></tr><tr><td>1139.9</td><td>C-H bend</td></tr></table></div>	Wavenumber (cm <sup>-1</sup> )	Assignment	1706.6	C=O stretch	1564.7	—	1444.0	—	1349.3	—	1309.2	—	1233.0	—	1139.9	—	Wavenumber (cm <sup>-1</sup> )	Assignment	1706.6	C=O stretch	1564.7	Aromatic ring stretch	1444.0	C-H bend	1349.3	C-H bend	1309.2	C-O stretch	1233.0	C-H bend	1139.9	C-H bend	Acceptable.	Yes	FAPC013343, Madsen, S.; Bridges, J. ; Cooper, D. Godbey, J.; Miller, R., 2002
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Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference																												
Nuclear magnetic resonance (NMR) B.2.4/03	OECD 101	clopyralid (99.8%)	<p>Proton NMR and carbon NMR spectra of clopyralid were consistent with the structure of clopyralid.</p> <div></div> <table><tr><th colspan="3">Proton NMR Spectrum Data</th></tr><tr><th>Chemical Shift (ppm)</th><th>Integration, m, J</th><th>Assignment</th></tr><tr><td>8.1</td><td>1H, d (J = 8.9 Hz)</td><td>Pyridine H4</td></tr><tr><td>7.7</td><td>1H, d (J = 8.9 Hz)</td><td>Pyridine H5</td></tr></table> <p>m = multiplicity (J, J coupling; d, doublet)</p> <table><tr><th colspan="2">Carbon NMR Spectrum Data</th></tr><tr><th>Chemical Shift (ppm)</th><th>Assignment</th></tr><tr><td>164.7</td><td>Carbonyl</td></tr><tr><td>149.2</td><td></td></tr><tr><td>148.0</td><td></td></tr><tr><td>142.0</td><td>Pyridine C4</td></tr><tr><td>127.6</td><td>Pyridine C3</td></tr><tr><td>127.4</td><td>Pyridine C5</td></tr></table>	Proton NMR Spectrum Data			Chemical Shift (ppm)	Integration, m, J	Assignment	8.1	1H, d (J = 8.9 Hz)	Pyridine H4	7.7	1H, d (J = 8.9 Hz)	Pyridine H5	Carbon NMR Spectrum Data		Chemical Shift (ppm)	Assignment	164.7	Carbonyl	149.2		148.0		142.0	Pyridine C4	127.6	Pyridine C3	127.4	Pyridine C5	Acceptable.	Yes	FAPC013343, Madsen, S.; Bridges, J. ; Cooper, D. Godbey, J.; Miller, R., 2002
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127.6	Pyridine C3																																	
127.4	Pyridine C5																																	
Mass spectra (MS) B.2.4/04	OECD 101	clopyralid (99.8%)	MS spectra of clopyralid were consistent with the structure of clopyralid.	Acceptable.	Yes	FAPC013343, Madsen, S.; Bridges, J. ; Cooper, D. Godbey, J.; Miller, R., 2002																												

Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference
			<p><b>Mass Spectrum Determination</b></p> <p>The mass spectrum of clopyralid is shown in Figure 1. In this spectrum, an adduct ion, [M-H]<sup>+</sup>, at <math>m/z</math> 190 was evident. The signal is in fact an ion cluster at <math>m/z</math> = 190.0/192.0 which is characteristic of the presence of two chlorine atoms in the molecular ion. The ion cluster at <math>m/z</math> = 249.6/251.5 is due to acetate adduct of the compound, while the cluster at <math>m/z</math> = 380.5/382.4 is due to the dimer [2M-H]<sup>+</sup>.</p> <p>Subsequently the ESI mass spectrometry data was examined further by selecting the molecular ion for MS/MS analysis in product ion scan mode. The precursor ion was fragmented by collisionally induced dissociation with normalized collision energy of 40% and the resulting spectrum is presented in Figure 2. In this spectrum, the molecular ion occurs at <math>m/z</math> = 191.9 and one principal ion cluster occurs at <math>m/z</math> = 145.9/147.8, which is consistent with the loss of COOH from the test substance.</p> <p>Figure 1. Mass Spectrum of Clopyralid</p>  <p>Figure 2. MS/MS Spectrum of Clopyralid</p> 			
Spectra for impurities B.2.4/05			no relevant impurities			

B.2.5. SOLUBILITY IN WATER						
Solubility in water B.2.5/01	EEC Method A6; OECD 105	clopyralid (99.2%)	at 20°C:  Unbuffered water (pH 1.7): 0.785 g/100 mL pH 5.0: 11.8 g/100 mL pH 7.0: 14.3 g/100 mL pH 9.0: 15.7 g/100 mL	Not acceptable. According to COMMISSION REGULATION (EU) No 283/2013 it is now a requirement to include validation data on the methods used in water, buffer solutions, organic solvents and any additional matrices used in the physical and chemical properties tests. Here only limited validation data (linearity, LOD) has been presented.  <b>According to the applicant</b> , a water solubility study can be conducted and be available by the end of 2018.	Yes	GHE-P-3084, Knowles, S. J. , 1993

B.2.6. SOLUBILITY IN ORGANIC SOLVENTS																
Solubility in organic solvents B.2.6/01	OECD 105	clopyralid (95.9%)	<table><tr><th>Solvent</th><th>Solubility at 20°C</th></tr><tr><td>Xylene</td><td>4.61 g/L</td></tr><tr><td>1,2-dichloroethane</td><td>20.7 g/L</td></tr><tr><td>Acetone</td><td>&gt;250 g/L</td></tr><tr><td>Ethyl acetate</td><td>102 g/L</td></tr></table>	Solvent	Solubility at 20°C	Xylene	4.61 g/L	1,2-dichloroethane	20.7 g/L	Acetone	>250 g/L	Ethyl acetate	102 g/L	Not acceptable. According to COMMISSION REGULATION (EU) No 283/2013 it is now a requirement to include validation data on the methods used in water, buffer solutions, organic solvents and any additional matrices used in the physical and chemical properties tests. Here only limited validation data	Yes	NAFST329, Comb, A. L. ; Madsen, S., 2001
Solvent	Solubility at 20°C															
Xylene	4.61 g/L															
1,2-dichloroethane	20.7 g/L															
Acetone	>250 g/L															
Ethyl acetate	102 g/L															

Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results		Comments (Acceptable / Non acceptable)	GLP	Reference
					(linearity, recovery) has been presented.  <b>According to the applicant</b> , a solvent solubility study can be conducted and be available by the end of 2018.		
	unknown; <b>not</b> OECD 105	clopyralid (96.4%)			Not acceptable. According to COMMISSION REGULATION (EU) No 283/2013 it is now a requirement to include validation data on the methods used in water, buffer solutions, organic solvents and any additional matrices used in the physical and chemical properties tests. Here no validation data has been presented.	Yes	GH-C 2238, Swayze, K., Gegel B., Schriber, C., 1989
<b>B.2.7. PARTITION COEFFICIENT N-OCTANOL/WATER</b>							
<b>Partition coefficient n-octanol/water B.2.7/01</b>	EEC Method A8; OECD 107	clopyralid (99.2%)	pH 5 buffer: logK <sub>ow</sub> = -1.81 at 20°C pH 7 buffer: logK <sub>ow</sub> = -2.63 at 20°C pH 9 buffer: logK <sub>ow</sub> = -2.55 at 20°C		Not acceptable. According to COMMISSION REGULATION (EU) No 283/2013 it is now a	Yes	GHE-P-3084, Knowles, S., 1993

Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference
				<p>requirement to include validation data on the methods used in water, buffer solutions, organic solvents and any additional matrices used in the physical and chemical properties tests. Here only limited validation data (linearity, LOD) has been presented.</p> <p><b>According to the applicant,</b> an octanol/water partition coefficient study can be conducted and be available by the end of 2018.</p>		
<b>B.2.8. DISSOCIATION IN WATER</b>						
<b>Dissociation constant B.2.8/01</b>	OECD 112	clopyralid (99.6%)	<p>pKa = 2.01 +/- 0.11 at 25°C</p> <p><b>According to the applicant,</b> the water solubility study demonstrates that the concentration used in the dissociation constant study is below the saturation concentration. Thus no validation is required.</p>	Acceptable.	Yes	ML-AL 91-041522, Reim, R. E. , 1992
<b>B.2.9. FLAMMABILITY AND SHELF-HEATING</b>						
<b>Flammability B.2.9/01</b>	EEC Method A10	clopyralid (95.9%)	Not flammable.	Acceptable.	Yes	NAFST329, Comb, A. L. ; Madsen, S., 2001

Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference
Self heating B.2.9/02	EEC Method A16	clopyralid (95.9%)	No self-ignition temperature prior to melting at ~151°C	Acceptable.	Yes	NAFST329, Comb, A. L. ; Madsen, S., 2001
B.2.10. FLASH POINT						
Flash point B.2.10/01			not required as material is a solid			
B.2.11. EXPLOSIVE PROPERTIES						
Explosive properties B.2.11/01	EEC Method A14	clopyralid (TGAI, 95.4%)	No sign of ignition or explosion		Yes	GHE-P-2183, Dawson, J. , 1990
B.2.12. SURFACE TENSION						
Surface tension B.2.12/01	EEC Method A5; OECD 115	clopyralid (TGAI, 95.4%)	55.4 mN/m at 21.5 ± 0.5 °C (0.7685 % aqueous solution)	Acceptable.	Yes	GHE-P-2183, Dawson, J. , 1990
		clopyralid (99.9%)	The surface tension of a 1 g/L aqueous solution of pure clopyralid was found to be 71.5 mN/m at 20°C	Acceptable.	Yes	NAFST-15-101, Dunning, J., 2015
B.2.13. OXIDISING PROPERTIES						
Oxidizing properties B.2.13/01	EEC Method A17	clopyralid (95.9%)	Non-oxidising.	Acceptable.	Yes	NAFST329, Comb, A. L. ; Madsen, S.,

Test or Study Annex Point	Guideline and method	Test material purity and specification	Used methods / Results	Comments (Acceptable / Non acceptable)	GLP	Reference
						2001
<b>B.2.14. OTHER STUDIES</b>						
<b>Relative density B.2.14/01</b>	EEC Method A3 (pycnometer)	clopyralid (TGAI, 95.4%)	1.5747 at $20 \pm 1$ °C	Acceptable.	Yes	
	OPPTS 830.7300 Gas pycnometer	clopyralid (99.8%)	1.763 g/cm <sup>3</sup> at $20.7 \pm 0.3$ °C	Acceptable. However, the value is that of the density and not the relative density.	Yes	



**B.2.15. REFERENCES RELIED ON**

<b>Data Point</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company Report No. Date GLP or GEP status Published or not</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>	<b>Previous evaluation</b>
CA 2.1/1 CA 2.3/2	Madsen, S.	2002	Determination of the Color, Odor, Physical State, And Melting Point of Clopyralid (Purified)  Dow AgroSciences LLC, Indianapolis, Indiana, United States DAS Report No. FAPC023323 19.12.2002 GLP/GEP (Y/N): Yes Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)
CA 2.1/2 CA 2.1/3	Madsen, S.	2003	Determination of Boiling/Decomposition Point for Clopyralid  Dow AgroSciences LLC, Indianapolis, Indiana, United States DAS Report No. FAPC033231 22.8.2003 GLP/GEP (Y/N): Yes Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)
CA 2.2/1	Srivastava, R. ; Chakrabarti, A. ; Griffin, K. A.	1991	Vapor Pressure of Clopyralid Measured By The Knudsen-Effusion/ Weight Loss Method.  Dow Chemical Company, Midland, Michigan, United States DAS Report No. ML-AL 91-020325 10.12.1991 GLP/GEP (Y/N): Yes Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)
CA 2.2/2	Swayze, K.	2000	Calculation of the Henry's Law Constants for Clopyralid from Unbuffered and pH 5, 7, And 9 Buffered Water  Dow AgroSciences LLC, Indianapolis, Indiana, United States DAS Report No. NAFST238 15.3.2000 GLP/GEP (Y/N): No Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)

<b>Data Point</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company Report No. Date GLP or GEP status Published or not</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>	<b>Previous evaluation</b>
CA 2.3/1	Fore, D. W. ; Hamilton, T. D.	1991	Determination of Color, Physical State, Odor and pH of Lontrel T Herbicide.  DowElanco, Midland, Michigan, United States DAS Report No. GH-C 2471 5.3.1991 GLP/GEP (Y/N): Yes Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)
CA 2.4/1	Elliott, T.	2014	Clopyralid: Determination of UV/Vis Absorption And Molar Absorptivity  ABC Laboratories Inc, Columbia, Missouri, United States DAS Report No. NAFST-14-91 16.4.2015 GLP/GEP (Y/N): Yes Published (Y/N): No	No	Yes	Active substance data submitted with an application under Article 15 of the Regulation (renewal) and with the application for renewal of authorisation of the corresponding product. Applies also to data submitted with applications for authorisation for products containing AIR2 substances (Regulation (EU) No 1141/2010).	DAS	Submitted for the purpose of renewal

<b>Data Point</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company Report No. Date GLP or GEP status Published or not</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>	<b>Previous evaluation</b>
CA 2.4/1 CA 2.4/2 CA 2.4/3 CA 2.4/4	Madsen, S.; Bridges, J. ; Cooper, D. Godbey, J.; Miller, R.	2002	Determination of the Mass, Infrared, Nuclear Magnetic Resonance, And Ultraviolet/Visible Spectra of Clopyralid  Dow AgroSciences LLC, Indianapolis, Indiana, United States DAS Report No. FAPC013343 22.2.2002 GLP/GEP (Y/N): Yes Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)
CA 2.5/1 CA 2.7/1	Knowles, S. J.	1993	Determination of Water Solubility And Partition Coefficient of Clopyralid (Pure), TSN100042 - 91021/CB  Pharmaco LSR Inc, Eye, Suffolk, United Kingdom DAS Report No. GHE-P-3084 14.4.1993 GLP/GEP (Y/N): Yes Published (Y/N): No	No	No	N/A	DAS	in DAR (2003)
CA 2.6/1 CA 2.9/1 CA 2.9/2 CA 2.13/1	Comb, A. L. ; Madsen, S.	2001	Determination of Solvent Solubility, Flammability, Self-Ignition Temperature, and Oxidising Properties for Clopyralid  Huntingdon Life Sciences Ltd, Suffolk, England DAS Report No. NAFST329 28.11.2001 GLP/GEP (Y/N): Yes PUBLISHED (Y/N): NO	No	No	N/A	DAS	in DAR (2003)
CA 2.6/1	Swayze, K., Gegel B., Schriber, C.	1989	Solubility of Clopyralid, Clopyralid 2-ethylhexyl ester, and Clopyralid 1-decyl ester in organic Solvents  Agricultural Chemistry R&D Laboratories, Midland, Michigan, United States DAS Report No. GH-C 2238 19.9.1989 GLP/GEP (Y/N): Yes PUBLISHED (Y/N): NO	No	No	N/A	DAS	in DAR (2003)

<b>Data Point</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company Report No. Date GLP or GEP status Published or not</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>	<b>Previous evaluation</b>
CA 2.8/1	Reim, R. E.	1992	Dissociation of Clopyralid  Dow Chemical Company, Midland, Michigan, United States DAS Report No. ML-AL 91-041522 20.3.1992 GLP/GEP (Y/N): Yes PUBLISHED (Y/N): NO	No	No	N/A	DAS	in DAR (2003)
CA 2.11/1 CA 2.12/1 CA 2.14/1	Dawson, J.	1990	The Determination of Physico-Chemical Properties of Lontrel T (Clopyralid) According To EEC/OECD Guidelines  Safepharm Laboratories Ltd, Derby, Derbyshire, United Kingdom DAS Report No. GHE-P-2183 08.1990 GLP/GEP (Y/N): Yes PUBLISHED (Y/N): NO	No	No	N/A	DAS	in DAR (2003)

<b>Data Point</b>	<b>Author(s)</b>	<b>Year</b>	<b>Title Source (where different from company) Company Report No. Date GLP or GEP status Published or not</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>	<b>Previous evaluation</b>
CA 2.12/1	Dunning, J.	2015	Determination of Surface Tension of Clopyralid - PAI Huntingdon Life Sciences, Occold, Ey,e Suffolk, England DAS Report No. NAFST-15-101 28.8.2015 GLP/GEP (Y/N): Yes PUBLISHED (Y/N): NO	No	Yes	Active substance data submitted with an application under Article 15 of the Regulation (renewal) and with the application for renewal of authorisation of the corresponding product. Applies also to data submitted with applications for authorisation for products containing AIR2 substances (Regulation (EU) No 1141/2010)	DAS	Submitted for the purpose of renewal
CA 2.14/1	Huntley, K.	2002	Determination of density for clopyralid.  ABC Laboratories, Inc., Columbia, Missouri, USA Report No.: NAFST595, Date:16.10.2002, GLP Non Published	No	No	N/A	DAS	in DAR (2003)