Section A1 Applicant

Annex Point IIA1

1.1	**Applicant**	Name:	BASF SE
		Address:	Carl-Bosch-Strasse 38, D-67058 Ludwigshafen, Germany
		Email:	biocides-europe@basf.com
1.2	**Manufacturer of Active Substance**	Name:	BASF SE
		Address:	Carl-Bosch-Strasse 38, D-67058 Ludwigshafen, Germany
		Email:	biocides-europe@basf.com
1.3	**Manufacturer of Product**	[redacted]:	As above

Finnish Safety and Chemicals Agency

16 January 2014

Please see Basf Confidential folder for identity of active substance.

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
3.1 Melting point, boiling point, relative density (IIA3.1)								
3.1.1 Melting point	Directive 92/69/EEC, A.1 Differential Scanning Calorimetry	[redacted] purity: [redacted] g/100 g glutaraldehyde and [redacted] g/100 g water	Peak maximum ca. -18 °C Extrapolated onset temperature ca. –33 °C (range is about –50 °C to –15 °C)		Y	1	[redacted] (2002) BPD ID A3.01.1_01	
3.1.2 Boiling point	Pesticide Assessment Guidelines, Subdivision D, 63-6 The boiling point was determined by visual observation, using capillary boling point tubes Test procedure according to an internal BASF standard, comparable to OECD 104 Buchi 510 GS-1 melting point apparatus	Glutaraldehyde ([redacted]% Solution)	101.5 °C at 987.1 hPa		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
		Glutaral, ca. [redacted] /100 g aqueous solution	101.95 °C at 1013.25 hPa		N	2	[redacted] (1995) BPD ID A3.01.2_02	
3.1.3 Bulk density/								

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
relative density	Pesticide Assessment Guidelines, Subdivision D, 63-7 Pycnometer method	Glutaraldehyde ([redacted]% Solution)	relative density d 20/4 = 1.1288	specific gravity (20°C/20°C) = 1.1308 +/- 0.0002	Y	1	[redacted] (1999) BPD ID A3.01.2_01	
3.2 Vapour pressure (IIA3.2)	Pesticide Assessment Guidelines, Subdivision D, 63-9	Glutaraldehyde ([redacted]% Solution)	20 hPa at 20.1 °C 28 hPa at 25.1 °C		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
	Directive 79/831/EWG, appendix V, part A.4, February 1990	[redacted]: [redacted]% glutaral, ca. [redacted]% water, [redacted]% methanol	20.06 hPa at 20 °C 27.21 hPa at 25 °C		Y	1	[redacted] (1993) BPD ID A3.02_02	
	Measured in an ebulliometer between 38° and 85°C and extrapolated down to 20°C	[Glut]-liquid (mass%) 0.010* 0.10* 2.0* 15.0* 50.0**	Glutaraldehyde partial pressure (hPa) 20°C / 25°C $0.20e^{-4}$* / $0.30e^{-4}$* $0.20e^{-3}$* / $0.30e^{-3}$* $0.41e^{-2}$* / $0.71e^{-2}$* $0.32e^{-1}$* / $0.54e^{-1}$* 0.13** / 0.21**	Glutaraldehyde in air saturated by aqueous glutaraldehyde solutions at a total pressure of 1013.25 hPa. Values derived from data in table 4 (ppm-volume in air). **A pure glutaraldehyde (100 %) sample was produced by evaporation	N	2	Olson JD (1998) BPD ID A3.02_03	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
				of an aqueous solution at reduced pressure. The vapour pressure experiments were carried out as successive pressure – temperature runs on one sample of glutaraldehyde charged to the ebulliometer. Extrapolation between the 50 % solution and working concentrations of glutaraldehyde cannot be made as the relationship is not linear. A linear relationship is however possible at				

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
				concentrations between 0-2 % and temperatures between 20-35 °C.				
3.2.1 Henry´s Law Constant (Pt. I-A3.2)	SRC HENRYWIN v3.10	Glutaraldehyde pure	**calculated result:** 0.011 Pa*m^3/mol at 25°C		N	2	[redacted] (2005) BPD ID A3.02.1_01	
3.3 Appearance (IIA3.3)								
3.3.1 Physical state	Pesticide Assessment Guidelines, Subdivision D, 63-3	Glutaraldehyde ([redacted]% Solution)	free flowing liquid		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
3.3.2 Colour	Pesticide Assessment Guidelines, Subdivision D, 63-2	Glutaraldehyde ([redacted]% Solution)	water clear		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
3.3.3 Odour	Pesticide Assessment Guidelines, Subdivision D, 63-4	Glutaraldehyde ([redacted]% Solution)	sweet aldehyde-like		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
3.4 Absorption spectra (IIA3.4) UV/VIS	UV/VIS spectroscopy	[redacted] (Glutaraldehyde	Medium λ_{max} ε	Under basic conditions (0.1	Y	2	[redacted] (2004) BPD ID A3.04.1_01	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
		[redacted]% solution in water), [redacted]	[nm] [l*mol^{-1}*cm^{-1}] neutral 234 14.9 neutral 282 5.9 acidic 234 14.5 acidic 282 6.1 basic 235 478.2 basic 283 22.3	N aqueous NaOH), the test item turns yellow due to a chemical reaction, as shown by the spectral change.				
IR	IR spectroscopy	[redacted] (Glutaric dialdehyde [redacted]% in water), [redacted]	The IR spectra show the signals expected for the test item (glutaric dialdehyde and water). IR-Bands at: 691 cm-1 H2O 1360 cm-1 CH2 1444 cm-1 CH2 1463 cm-1 CH2 1647 cm-1 H2O 1712 cm-1 C=O 2956 cm-1 CH2 3405 cm-1 H2O,-OH		Y	2	[redacted] (2006) BPD ID A3.04.2_01	
NMR	^{1}H-NMR spectroscopy	[redacted] (Glutaric dialdehyde [redacted]% in water), [redacted]	The 1H-NMR spectrum of the test item shows the signals expected for the chemical structure of the test item and additional signals of reaction products between glutaric dialdehyde and		Y	2	[redacted] (2006) BPD ID A3.04.2_01	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
MS	Capillary GC/MS of the positive ions after electron impact ionisation (EI) and chemical ionisation (CI)	[redacted] (Glutaraldehyde [redacted]% solution in water), [redacted]	water. ^{1}H-NMR-Bands at: 1.1-1.8, 2.5, 4.7-5.2, 9.6 ppm Fragmentation ions of glutaraldehyde at m/z 82, 72, 57, 44, 29	The MS spectrum is consistent with the structure of glutaraldehyde. The C-NMR was not needed.	Y	2	[redacted] (2004) BPD ID A3.04.1_01	
3.5 Solubility in water (IIA3.5)	Internal standard method (because Directive 92/69/EEC, A.6 is not applicable)	[redacted] purity: [redacted] g/100 g glutaraldehyde and [redacted] g/100 g water	**pH temperature result** 5 20.2+/- 0.1°C miscible 7 20.2+/- 0.1°C miscible 9 20.2+/- 0.1°C miscible	Because of complete miscibility, the dependence on temperature is negligible and therefore not investigated.	Y	2	[redacted] (2002) BPD ID A3.05_01	
3.6 Dissociation constant (-)	Pesticide Assessment Guidelines, Subdivision D, 63-10	Glutaraldehyde ([redacted]% Solution)	Determinations were not possible. Glutaraldehyde has no ionisable groups and no ionisation/dissociation in water is expected.	Attempted spectrophoto-metric and titration methods	Y	1	[redacted] (1999) BPD ID A3.01.2_01	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
3.7 Solubility in organic solvents, including the effect of temperature on solubility (IIIA3.1)	Internal standard method (because Directive 92/69/EEC, A.6 is not applicable)	[redacted] ([redacted]): [redacted] g glutaraldehyde / 100 g	The test item is miscible in any ratio with methanol and with 1,4-dioxane at 20 °C and at 30 °C.	With 1-octanol, a phase separation was observed, because of the high amount of water in the test item. Due to this high amount of water, the determination of the solubility of the test item in solvents with low polarity is not feasible.	Y	2	[redacted] (2006) BPD ID A3.07_01	
3.8 Stability in organic solvents used in b.p. and identity of relevant breakdown products (IIIA3.2)				Organic sol-vents not used in the biocidal products				

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
3.9 Partition coefficient n-octanol/water (IIA3.6)	Directive 92/69/EEC, A.8, OECD 107 a shake flask method	[redacted] ([redacted]% glutar-aldehyde), [redacted]	pH temperature result log Pow 5 23 +/- 1 °C -0.41 7 23 +/- 1 °C -0.36 9 23 +/- 1 °C -0.80	Theoretical value: -0.18 (calculation with EPIWIN-software, Syracuse Research Corp., 1992-94, Merrill Lane, Syracuse, N.Y.)	Y	1	[redacted] (2002) BPD ID A3.09_01	
3.10 Thermal stability, identity of relevant breakdown products (IIA3.7)	OECD 113	[redacted] (Glutaraldehyde [redacted]% solution in water), [redacted]	1.Peak: Onset temperature: 85°C Peak temperature: 246°C Energy release: 355J/g 2.Peak: Onset temperature: 330°C Peak temperature: 385°C Energy release: 245J/g	Exact procedure to be added, and interpretation of results: Calorimetric analysis. The on set of first peak is close to evaporation temperature of water. The wide peak is difficult to interpret.as well as the second one.	Y	1	[redacted] (2004) BPD ID A3.10_01	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
	Expert judgement	[redacted]	[redacted] is a non-flammable (aqueous) solution which is stable at normal temperatures. If subjected to high temperatures in excess of 100°C, after the water phase evaporates, the remaining material is likely to produce carbon monoxide and/or carbon dioxide gases.		N	2	[redacted] (2006) BPD ID A3.10_02	
3.11 Flammability, including auto-flammability and identity of combustion products (IIA3.8)	Directive 92/69/EEC, A.15	[redacted] (Glutaraldehyde [redacted]% solution in water), [redacted]	AIT = 395 °C at 1002 – 1006 hPa	Tests A10, A11, and A16 have not been carried out because the substance is a liquid. Test A12 has not been carried out because the chemical structure of the test substance does not contain metals or metalloids *.	Y	1	[redacted] (2004) BPD ID A3.10_01	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
				Test A13 has not been carried out because the substance is known to be stable at room temperature for prolonged periods of time (days) *. * cf. UN Recommen-dations on the transport of dangerous goods, Manual of tests and criteria, Appendix 6				
3.12 Flash-point (IIA3.9)	Pesticide Assessment Guidelines, Subdivision D, 63-15	Glutaraldehyde ([redacted]% Solution)	No flashpoint was observed for either sample at temperatures up to 95°C		Y	1	[redacted] (1999) BPD ID A3.01.2_01	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
3.13 Surface tension (IIA3.10)	OECD 115 TE IM Lauda tensiometer	[redacted] (Glutaraldehyde [redacted]% solution in water), [redacted]	ca. 68 mN/m at 20 °C (0.2% aqueous preparation of the test item corresponds to a 0.1% solution of pure glutaraldehyde)	The active ingredient is not surface-active	Y	1	[redacted] (2004) BPD ID A3.13_01	
3.14 Viscosity (-)	Pesticide Assessment Guidelines, Subdivision D, 63-18 Cannon-Fenske viscometer Kinematic viscosity	Glutaraldehyde ([redacted]% Solution)	12.75 mm^2/s at 25 °C		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
3.15 Explosive properties (IIA3.11)	Directive 92/69/EEC, A.14	[redacted] (Glutaraldehyde [redacted]% solution in water), [redacted]	The test substance is not considered to present a danger of explosion in the sense of the directive.		Y	1	[redacted] (2004) BPD ID A3.10_01	
	Expert judgement	Glutaraldehyde	Not explosive	The substance has no chemical groups indicating explosive properties. This statement agrees with the recommenda-	N	2	[redacted] (2000) BPD ID A3.15_02	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
				tions on the transport of dangerous goods, Manual of Tests and Criteria, Appendix 6 (third revised edition) of the United Nations				
3.16 Oxidizing properties (IIA3.12)	Pesticide Assessment Guidelines, Subdivision D, 63-14	Glutaraldehyde ([redacted]% Solution)	No noticeable change in temperature or evolution of gas were observed for any of the mixtures.		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
	Expert judgement	Glutaraldehyde	no oxidizing properties	The substance has no chemical groups indicat-ing oxidizing properties. This statement agrees with the recommenda-tions on the transport of dangerous goods, Manual of Tests and Criteria,	N	2	[redacted] (2000) BPD ID A3.15_02	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
				Appendix 6 (third revised edition) of the United Nations				
3.17 Reactivity towards container material (IIA3.13)	Pesticide Assessment Guidelines, Subdivision D, 63-20	Glutaraldehyde ([redacted]% Solution)	Plastic and stainless steel : No evidence of corrosion was observed for either type of container after storage at ca. 54 °C for 33 days.		Y	1	[redacted] (1999) BPD ID A3.01.2_01	
		Glutaraldehyde (aqueous solutions)	**Material Compatibility** Carbon Steel not comp. Stainless Steel types 304, 304L, 316 and 316L comp. Iron not comp. Titanium comp. Copper-Nickel Alloy n. c. Nickel comp. Aluminium not comp. Copper not comp. Nickel-Chromium-Molybdenum Alloys comp. Fiberglas-reinforced plastics comp. PVC comp. Polyethylene comp. Baked Phenolics comp.		N	2	[redacted] (2004) BPD ID A3.17_02	

Doc III-A Section 3 Physical and Chemical Properties of Active Substance

Subsection (Annex Point)	Method	Purity/ Specification	Results Give also data on test pressure, temperature, pH and concentration range if necessary	Remarks/ Justification	GLP (Y/N)	Reli-abi-lity	Reference	Official use only
			Rubber linings can swell when in contact with glutar-aldehyde products and should therefore not be used. The same is true for many other natural and synthetic rubber materials. Special care should be taken when choosing gasket materials. The use of incompatible materials may lead to product leakage or material failure. PTFE is recommended for all gaskets.					

The eCA FI note May 2014: The Table above has been updated post TM III 2011.

At product authorization product information submitted should contain adequate information on technical product properties including a two year test at ambient temperature, information on persistent foaming and dilution stability should be submitted as relevant for types of application, as well as application relevant information on compatibilities with other products.

Section A3.6	Dissociation constant	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible** [X] **Scientifically unjustified** [ ]	
Limited exposure [ ]	**Other justification** [ ]	
Detailed justification:	Attempts were made to determine the dissociation constant of the test substance by both spectrophotometric and titration methods. Due to the nature of the test substance, determinations were not possible. [redacted] **(1999)** Product Chemistry for Glutaraldehyde ([redacted]% Solution), Series 63 - Physical and Chemical Characteristics. [redacted], **BPD ID A3.01.2_01** (Unpublished)	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	14.04.2009	
Evaluation of applicant's justification	Determinations were not possible. Glutaraldehyde has no ionisable groups and no ionisation/dissociation in water is expected.	
Conclusion	The applicant's justification is acceptable.	
Remarks	Aldehydes are neutral organics and do not undergo dissociation.	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	
Conclusion	*Discuss if deviating from view of rapporteur member state*	
Remarks		

Section A3.7 Annex point. IIIA, III. 1.	**Solubility in organic solvents, including the effect of temperature on solubility *(non polar organic solvents)***	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ] **Limited exposure [ ]**	**Technically not feasible [X]** **Scientifically unjustified [ ]** **Other justification [ ]**	
Detailed justification:	Determination of the solubility in octanol is not feasible, due to the water content of the test substance. The immiscibility of the two would lead to partitioning of the active ingredient between water and octanol, rather than solubility of the active ingredient in octanol. Due to this high amount of water, the determination of the solubility of the test item in solvents with low polarity is not feasible. **Dolich T (2006)** Physico-chemical properties of "[redacted]", [redacted], **BPD ID A3.07_01** (Unpublished) [redacted] **(1999)** Product Chemistry for Glutaraldehyde ([redacted]), Series 63 - Physical and Chemical Characteristics. [redacted], **BPD ID A3.01.2_01** (Unpublished)	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	14.04.2009	
Evaluation of applicant's justification	The solubility of glutaraldehyde (pure) in octanol could be calculated without testing from the study 3.9 Partition coefficient n-octanol/water (IIA3.6) [redacted] (2002) BPD ID A3.09_01. In general, it is not very usefull to scan solvents capable to dissolve (50/50) glutaraldehyde/water mixture but rather give information on solubility of glutaraldehyde in organic solvents.	
Conclusion	Further testing is not required, but rather some more discussion/ submission of specific data of solubility of glutaraldehyde in non-polar solvents	
Remarks		
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	
Conclusion	*Discuss if deviating from view of rapporteur member state*	

Section A3.7 Annex point. IIIA, III. 1.	Solubility in organic solvents, including the effect of temperature on solubility *(non polar organic solvents)*
Remarks	

Section A3.8 Annex Point IIIA, III. 2.	Stability in organic solvents used in biocidal products and identity of relevant breakdown products	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [X]	**Technically not feasible** [ ] **Scientifically unjustified** [ ]	
Limited exposure [ ]	**Other justification** [ ]	
Detailed justification:	The active substance as manufactured does not include an organic solvent. (cf. Doc III A2.8 Identity of impurities and additives)	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	14.04.2009	
Evaluation of applicant's justification	Organic solvent is not included	
Conclusion	The applicant's justification is acceptable.	
Remarks		
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	
Conclusion	*Discuss if deviating from view of rapporteur member state*	
Remarks		

Section A3.11 Ann IIA, III. 3.8.	Flammability including auto-flammability and identity of combustion products	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible** [ ] **Scientifically unjustified** [X]	
Limited exposure [ ]	**Other justification** [ ]	
Detailed justification:	Tests A10, A11, and A16 have not been carried out because the substance is a liquid. Test A12 has not been carried out because the chemical structure of the test substance does not contain metals or metalloids *. Test A13 has not been carried out because the substance is known to be stable at room temperature for prolonged periods of time (days) *. * cf. UN Recommendations on the transport of dangerous goods, Manual of tests and criteria, Appendix 6 [redacted] **(2004)** Evaluation of physical and chemical properties according to Directive 92/69/EC: Annex A.9-A.17. [redacted], **BPD ID A3.10_01** (Unpublished)	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	14.04.2009	
Evaluation of applicant's justification	Applicant's justification lists the tests which are not applicable to this substance. However, justification does not conclude if any testing/information requirement regarding flammability and auto-flammability actually applies (is reasonable) to this substance.	
Conclusion	Applicant's justification is acceptable. The justification and Table IIIA could be added/ reworded according to the comment/evaluation(above) and remark (below)	
Remarks	According to already existing study data conclusions have been made: "Glutaraldehyde ([redacted]% aqueous solution) is a non-flammable liquid, and it is not pyrophoric" has been concluded in document GA Doc 1.2 Appendix 1 and further "GA is non flammable (aqueous) solution which is stable at normal temperatures" in document BPD ID A3.10_02.pdf.	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	

Section A3.11 **Ann IIA, III. 3.8.**	**Flammability including auto-flammability and identity of combustion products**
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

Official use only

1 REFERENCE

1.1 Reference [redacted]

1.2 Data protection Yes

1.2.1 Data owner BASF AG

1.2.2 Companies with letter of access [redacted]

1.2.3 Criteria for data protection Data on new a.s. for first entry to Annex I authorisation

2 GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study [redacted]

2.2 GLP [redacted]

2.3 Deviations [redacted]

3 MATERIALS AND METHODS

3.1 Preliminary treatment

3.1.1 Extraction [redacted]

3.1.2 Cleanup [redacted]

3.2 Detection

3.2.1 Separation method [redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

[redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

[redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

[redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

[redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

[redacted]

3.2.2 Detector [redacted]

3.2.3 Standard(s) [redacted]

3.2.4 Interfering substance(s) See 3.4

3.3 Linearity

3.3.1 Calibration range [redacted]

3.3.2 Number of measurements [redacted]

3.3.3 Linearity [redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

3.4 Specifity: interfering substances

[redacted]

c) [redacted]

3.5 Recovery rates at different levels

[redacted]

3.5.1 Relative standard deviation

[redacted]

3.6 Limit of determination

[redacted]

3.7 Precision

3.7.1 Repeatability

[redacted]

3.7.2 Independent laboratory validation

[redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

[redacted]

4.2 Conclusion

[redacted]

4.2.1 Reliability [redacted]

4.2.2 Deficiencies [redacted]

Section A4.1 _ 01
Annex Point IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde and Impurities

Evaluation by Competent Authorities

EVALUATION BY RAPPORTEUR MEMBER STATE

Date	18 April 2008, Revised post TM discussions and commenting May 2014
Materials and methods	Applicant's version is acceptable.
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	[redacted]

COMMENTS FROM ...

Date	*Give date of comments submitted*
Results and discussion	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.1 _ 02
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde in "[redacted]"

Official use only

	1 REFERENCE	
1.1	**Reference**	[redacted]
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF AG
1.2.2	Companies with letter of access	[redacted]
1.2.3	Criteria for data protection	Data on new a.s. for first entry to Annex I authorisation
	2 GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	[redacted]
2.2	**GLP**	[redacted]
2.3	**Deviations**	[redacted]
	3 MATERIALS AND METHODS	
3.1	**Preliminary treatment**	
3.1.1	Enrichment	[redacted]
3.1.2	Cleanup	[redacted]
3.2	**Detection**	
3.2.1	Separation method	[redacted]

Section A4.1 _ 02
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde in "[redacted]"

[redacted]

3.2.2 Detector [redacted]

3.2.3 Standard(s) [redacted]

[redacted]

3.2.4 Interfering substance(s) [redacted]

3.3 Linearity

3.3.1 Calibration range [redacted]

3.3.2 Number of measurements [redacted]

3.3.3 Linearity [redacted]

Section A4.1 _ 02
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde in "[redacted]"

3.4 Specifity:

[redacted]

3.5 Recovery rates at different levels

[redacted]

3.5.1 Relative standard deviation

[redacted]

3.6 Limit of determination

[redacted]

3.7 Precision

[redacted]

3.7.1 Repeatability

[redacted]

3.7.2 Independent laboratory validation

[redacted]

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

[redacted]

4.2 Conclusion

[redacted]

4.2.1 Reliability

[redacted]

4.2.2 Deficiencies

[redacted]

Section A4.1 _ 02
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Glutaraldehyde in "[redacted]"

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	18 April 2008
Materials and methods	Applicant's version is acceptable.
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Results and discussion	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.1 _ 03
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Methanol in "Protectol GA 50"

Official use only

1 REFERENCE

1.1 Reference

[redacted]

1.2 Data protection

Yes

1.2.1 Data owner

BASF AG

1.2.2 Companies with letter of access

[redacted]

1.2.3 Criteria for data protection

Data on new a.s. for first entry to Annex I authorisation

2 GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study

[redacted]

2.2 GLP

[redacted]

2.3 Deviations

[redacted]

3 MATERIALS AND METHODS

3.1 Preliminary treatment

3.1.1 Enrichment

[redacted]

3.1.2 Cleanup

[redacted]

3.2 Detection

3.2.1 Separation method

[redacted]

Section A4.1 _ 03
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Methanol in "Protectol GA 50"

[redacted]

3.2.2 Detector [redacted]

3.2.3 Standard(s) [redacted]

3.2.4 Interfering substance(s) [redacted]

3.3 Linearity

3.3.1 Calibration range [redacted]

3.3.2 Number of measurements [redacted]

3.3.3 Linearity [redacted]

Section A4.1 _ 03
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Methanol in "Protectol GA 50"

3.4 Specifity:

[redacted]

3.5 Recovery rates at different levels

[redacted]

3.5.1 Relative standard deviation

[redacted]

3.6 Limit of determination

[redacted]

3.7 Precision

3.7.1 Repeatability

[redacted]

3.7.2 Independent laboratory validation

[redacted]

Section A4.1 _ 03
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Methanol in "Protectol GA 50"

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods

[redacted]

4.2 Conclusion

[redacted]

4.2.1 Reliability

[redacted]

4.2.2 Deficiencies

[redacted]

Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	18 April 2008
Materials and methods	Applicant's version is acceptable.
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Results and discussion	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.1 _ 04
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Oligomers in "Protectol GA 50"

Official use only

1 REFERENCE

1.1 Reference [redacted]

1.2 Data protection Yes

1.2.1 Data owner BASF AG

1.2.2 Companies with letter of access [redacted]

1.2.3 Criteria for data protection Data on new a.s. for first entry to Annex I authorisation

2 GUIDELINES AND QUALITY ASSURANCE

2.1 Guideline study [redacted]

2.2 GLP [redacted]

2.3 Deviations [redacted]

3 MATERIALS AND METHODS

3.1 Preliminary treatment

3.1.1 Enrichment [redacted]

3.1.2 Cleanup [redacted]

3.2 Detection

3.2.1 Separation method [redacted]

Section A4.1 _ 04
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Oligomers in "Protectol GA 50"

[redacted]

Section A4.1 _ 04
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Oligomers in "Protectol GA 50"

[redacted]

3.2.2 Detector [redacted]

3.2.3 Standard(s) [redacted]

3.2.4 Interfering substance(s) [redacted]

3.3 Linearity

3.3.1 Calibration range [redacted]

3.3.2 Number of measurements [redacted]

3.3.3 Linearity [redacted]

3.4 Specifity: interfering substances [redacted]

3.5 Recovery rates at different levels [redacted]

3.5.1 Relative standard deviation [redacted]

3.6 Limit of determination [redacted]

3.7 Precision

3.7.1 Repeatability [redacted]

3.7.2 Independent laboratory validation [redacted]

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1 Materials and methods [redacted]

4.2 Conclusion [redacted]

4.2.1 Reliability [redacted]

4.2.2 Deficiencies [redacted]

Section A4.1 _ 04
Ann. IIA, IV.4.1

Analytical Method for Detection and Identification of Oligomers in "Protectol GA 50"

	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	March 11th, 2011
Materials and methods	[redacted]
Conclusion	[redacted]
Reliability	[redacted]
Acceptability	[redacted]
Remarks	
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Results and discussion	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.2a Ann. IIA, IV.4.2.	Analytical methods in relevant environmental media (a) soil	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	Technically not feasible [ ] Scientifically unjustified [X]	
Limited exposure [X]	Other justification [ ]	
Detailed justification:	Supported uses for glutaraldehyde based biocides are unlikely to give direct exposure to soil. Transfer of glutaraldehyde or its metabolites to soil where sewage sludge solids are used as fertiliser, is also highly unlikely. Glutaraldehyde is readily biodegradable (Ref 1) and unlikely to persist in the sewage treatment process. Simulation testing has demonstrated that absorption to sewage sludge does not occur (Ref 2). Studies have shown that in the unlikely event that directs soil exposure did occur, glutaraldehyde would be rapidly transformed by soil microbial activity under either aerobic (Ref 3) or anaerobic conditions (Ref 4). The DT_{50} for metabolism in aerobic soil was 1.7 days and were all less than 10% of the total [C^{14}]-glutaraldehyde applied (Ref 3). Leung (2001) also confirmed the rapid microbial biotransformation of glutaraldehyde under anaerobic conditions (Ref 5). In soil adsorption/desorption studies, the mobility of glutaraldehyde was found to be high or very high, with one exception (Ref 6). Glutaraldehyde appeared to have less mobility in a soil classed as loamy sand. However the soil's low cation exchange capacity, more alkaline pH and minimal soil organic matter, indicated that processes other than soil particle surface adsorption or bulk absorption, may have been involved. Chemical analysis of soil for glutaraldehyde is scientifically unjustified as persistence or accumulation of glutaraldehyde or its metabolites in soil is not expected in top or subsoil zones. (1) [redacted] (1993) Determination of the biodegradability or the elimination of Protectol GDA in the DOC Die Away (ISO 7827)-Test. [redacted] (Unpublished), BPD ID A7.01.1.2.1_01 (2) [redacted] (1998) Determination of the biodegradability of [redacted] in the Activated Sludge Simulation Test according to GLP, EN 45001 and ISO 9002. [redacted] (Unpublished), BPD ID A7.01.2.1.1_01 (3) [redacted] (1986) Aerobic soil metabolism of 14C-glutaraldehyde. [redacted] (Unpublished), BPD ID A7.02.1_01 (4) [redacted] (1986) Anaerobic aquatic metabolism of glutaraldehyde. [redacted] (Unpublished), BPD ID A7.01.2.1.2_01 (5) Leung H-W (2001) Aerobic and anaerobic metabolism of glutaraldehyde in a river water-sediment system. Arch. Environ. Contam Toxicol. 41: 267-273 (Published), BPD ID A7.01.1.1.1_05(*). (6) [redacted] (1985) Determination of adsorption/desorption constants of 14C-Glutaraldehyde. [redacted] (Unpublished), BPD ID A7.01.3_01 (*)The data reported within this publication are scientifically acceptable as material, method and results were well documented.	
Undertaking of intended data	Not relevant	

Section A4.2a Ann. IIA, IV.4.2.	Analytical methods in relevant environmental media (a) soil
submission [ ]	
	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	18 April 2008
Evaluation of applicant's justification	The scientific data supports the applicant's justification.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.2b _ 01
Ann. IIA, IV.4.2.

Analytical Method for Detection and Identification of Glutaraldehyde in air

Official use only

1 REFERENCE

1.1	**Reference**	Hendricks W (1987) Glutaraldehyde. Organic Methods Evaluation Branch, OSHA Analytical Laboratory, Salt Lake City, Utah, OSHA Method No. 64, BPD ID A4.02b_01
1.2	**Data protection**	No (published data)
1.2.1	Data owner	Not relevant
1.2.2	Companies with letter of access	[redacted]
1.2.3	Criteria for data protection	No data protection claimed

2 GUIDELINES AND QUALITY ASSURANCE

2.1	**Guideline study**	No
2.2	**GLP**	No data
2.3	**Deviations**	Not applicable

3 MATERIALS AND METHODS

3.1 Preliminary treatment

3.1.1 Enrichment

PROCEDURE TO COAT GLASS-FIBER FILTERS WITH DNPH/PHOSPHORIC ACID AND ASSEMBLY OF THE SAMPLING DEVICE

APPARATUS

Hotplate

Miscellaneous glassware: 250-ml volumetric flask, 30-, 50-, and 150-ml beakers, pipets, etc.

Plastic air monitoring cassettes, for 37-mm diameter filters. Unassembled 3-piece cassettes and extra center support sections were obtained from Gelman Sciences for use in this evaluation.

REAGENTS

Acetonitrile, HPLC grade. American Burdick and Jackson acetonitrile was used in this evaluation.

2,4-Dinitrophenylhydrazine (DNPH). DNPH (70%), Lot No. 1707 LJ, obtained from Aldrich Chemical Company, was recrystallized from hot acetonitrile for use in this evaluation.

Glass-fiber filters, 37-mm diameter Gelman Sciences Type A glass-fiber filters, Lot No. 8318, were used in this evaluation.

Phosphoric acid, reagent grade. "Baker analyzed" Reagent grade 85% phosphoric acid was used in this evaluation.

DNPH/phosphoric acid solution. Prepare this solution by diluting 1 g of

recrystallized DNPH and 5 ml of 85% phosphoric acid to 250 ml with acetonitrile.

PROCEDURE

(CAUTION! Evaporation of acetonitrile must be performed in a fume hood.)

Place a glass-fiber filter on a 30-ml beaker, or some other suitable support, so that only the outside edge of the filter is supported. Pipet 0.5 ml of the DNPH solution onto the surface of the filter. Make sure that the filter is completely saturated with the solution. Allow the acetonitrile to evaporate for about 20 min. Place the coated filters in a suitable container and allow them to dry overnight. Analyze a blank filter to determine if there are any severe analytical interferences present. If a batch of filters is not suitable, discard the reagents and the filters.

Prepared filters were tested for shelf-life by storing them in a tightly sealed container either at ambient temperature or at -20°C. Stored filters were used to periodically sample controlled test atmospheres for a month. Sample results did not appear to be dependent on filter storage temperature but prepared filters should be stored at reduced temperature as a precaution against reagent decomposition. Filters prepared and stored as described remain usable for at least a month.

Assemble the sampling device by placing a coated filter in the outlet section of the air monitoring cassette. Next, place a center support section on the first filter. Now, put another coated filter on the center support section and another center support section on top of that filter. Complete the assembly by placing the inlet section on the center support section. Plug the outlet and inlet openings with plastic end plugs. Put the air sampler on a table top with the outlet section down. Press on the top of the air sampler with sufficient force to seal the cassette. Use masking tape or shrink bands to further seal the two center and the outlet sections of the cassette. Store the assembled air sampler at reduced temperature (if possible) when there is an appreciable time before it is to be used for sampling.

SAMPLING PROCEDURE

Samples are collected by use of a personal sampling pump that can be calibrated to within +/-5% of the recommended flow rate.

A sample is collected using an open-face air monitoring cassette containing 2 glass-fiber filters. The filters are separated and retained using cassette center sections. Each filter is coated with DNPH and phosphoric acid.

The recommended air volume is 15 l and the recommended sampling rate is 1 l/min. When longer term sampling is necessary, the recommended air volume is 120 l and the recommended sampling rate is 1 l/min.

The collected samples are kept in the dark whenever possible as a precaution against photodecomposition.

At least one blank with each set of samples is to submitted. The blank should be handled the same as the other samples except that no air is drawn through it.

SAMPLE PREPARATION

Open the air monitoring cassette and remove the front coated filter. Fold this filter in half, twice (resulting in quarter circle) and place it in a 4-ml glass vial. Remove the backup filter, fold it in a similar manner as the front filter and place it in a separate 4-ml glass vial. Do not wad or crumple the filters.

Add 2.0 ml of acetonitrile to each vial.

Seal the vials with Teflon-lined septum caps and place them on the tube rotator. Set the rotation speed to 60 rpm and allow them to extract for 1 h.

EXTRACTION EFFICIENCY AND STABILITY OF EXTRACTED SAMPLES

The average extraction efficiency for glutaraldehyde from DNPH coated glass-fiber filters at the target concentration was essentially 100%.

Extracted samples remain stable for at least 16 h.

3.1.2 Cleanup

No data

3.2 Detection

3.2.1 Separation method

APPARATUS

A high performance liquid chromatograph (HPLC) equipped with a UV detector and a manual or automatic sample injector. A Waters Associates Model 6000A HPLC pump, a Waters Associates Model 440 UV detector and a Waters Associates Model U6K manual sample injector were used in this evaluation.

An HPLC column capable of resolving the glutaraldehyde-DNPH derivative from interferences. A 25-cm x 4.6-mm i.d. DuPont Zorbax CN (PN 850952-705) HPLC column was used in this evaluation.

Vials, 4-ml glass with Teflon-lined septum caps.

Volumetric flasks, pipets and syringes for preparing standards, making dilutions and performing injections.

An electronic integrator or some other suitable means to measure detector response. A Hewlett-Packard Model 3357 Data System was used in this evaluation.

REAGENTS

Acetonitrile, HPLC grade. American Burdick and Jackson acetonitrile

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Ann. IIA, IV.4.2.

Analytical Method for Detection and Identification of Glutaraldehyde in air

UV was used in this evaluation.

Water, HPLC grade. Water from a Millipore Milli-Q water filtration system was used in this evaluation.

Phosphoric acid, reagent grade. "Baker Analyzed" Reagent grade 85% phosphoric acid was used in this evaluation.

Glutaraldehyde. Aldrich Chemical Company, 25% by weight solution in water, glutaraldehyde was used in this evaluation. This solution contained 229.5 mg/ml glutaraldehyde as determined by the procedure to determine glutaraldehyde by acid titration.

2,4-Dinitrophenylhydrazine (DNPH). DNPH (70%), Lot No. 1707 LJ, obtained from Aldrich Chemical Company was recrystallized from hot acetonitrile for use in this evaluation.

Analytical standard preparation solution. This solution is prepared by diluting 1 g of recrystallized DNPH and 5 ml of phosphoric acid to 1 l with acetonitrile.

STANDARD PREPARATION

It is recommended that standards be prepared about 1 h before the air samples are to be analyzed in order to insure the complete reaction between glutaraldehyde and DNPH. Standards should be prepared fresh daily. The actual concentration of the glutaraldehyde solution should be determined by acid titration. As a precaution against photodecomposition, standards and samples should be kept in the dark whenever possible.

Prepare glutaraldehyde standard solutions by diluting known volumes of the nominal 25% glutaraldehyde solution with acetonitrile. A solution containing 0.23 mg/ml glutaraldehyde was prepared by diluting 1.0 ml of the reagent to 1000 ml with acetonitrile.

Place 2.0-ml aliquots of analytical standard preparation solution into each of several 4-ml glass vials. Seal each vial with a Teflon-lined septum cap.

Prepare standards by injecting appropriate volumes of glutaraldehyde standard solution into the sealed 4-ml vials. A standard containing 5.6 µg/ml glutaraldehyde was prepared by injecting 50 µl of 0.23 mg/ml glutaraldehyde into a vial containing 2.0 ml of analytical standard preparation solution.

Prepare a sufficient number of standards to generate a calibration curve. Analytical standard concentrations should bracket sample concentrations.

ANALYSIS

HPLC conditions

column:	DuPont Zorbax CN, 25-cm x 4.6-mm i.d. (PN850952-705)
mobile phase:	55% acetonitrile in water containing 0.1% phosphoric acid (v/v/v)
flow rate:	1 ml/min

injection volume:	10 µl
UV detector:	365 nm
retention time:	5.9 min

Use a suitable method such as electronic integration to measure detector response.

Use an external standard procedure to prepare a calibration curve with several standard solutions of different concentrations. Prepare the calibration curve daily. Program the integrator to report results in ug/ml.

Make sure that sample concentrations are bracketed with standards as stated .

CALCULATIONS

Results are obtained by use of calibration curves. Calibration curves are prepared by plotting detector response against concentration in ug/ml for each standard. The best line through the data points is determined by curve fitting.

The concentration in µg/ml for a particular sample is determined by comparing its detector response to the calibration curve. If glutaraldehyde is found on the backup filter, it is added to the amount found on the front filter. Blank corrections should be performed before adding the results together.

The glutaraldehyde air concentration can be expressed using the following equation:

$$mg/m^3 = (A)(B)/(C)$$

where A = concentration of the particular sample above (µg/ml)
B = extraction volume in ml
C = liters of air sampled

The following equation can be used to convert glutaraldehyde results in mg/m^3 to ppm at 25°C and 760 mm Hg:

$$ppm = (mg/m^3)(24.46)/(100.12)$$

where mg/m^3 = result of glutaraldehyde air concentration
24.46 = molar volume at 760 mm Hg and 25°C
100.12 = molecular weight of glutaraldehyde

PROCEDURE TO DETERMINE GLUTARALDEHYDE BY ACID TITRATION

Section A4.2b _ 01
Ann. IIA, IV.4.2.

Analytical Method for Detection and Identification of Glutaraldehyde in air

APPARATUS

Miscellaneous glassware. Fifty-ml burette, 250-ml Erlenmeyer flasks, 1-l volumetric flasks, pipets, etc.

REAGENTS

Sodium sulfite, anhydrous. Prepare a 0.1 M solution by dissolving 12.6 g of the salt in 1 l of deionized water.

Hydrochloric acid, reagent grade. Prepare a 0.1 N solution by diluting 7.9 ml of 38% HCl to 1 l with deionized water.

Thymolphthalein indicator. Prepare a 0.1% solution in ethanol.

Methyl orange indicator. Prepare a 0.1% solution in ethanol.

Sodium carbonate, ACS primary standard grade.

PROCEDURE

Standardize the 0.1 N HCl solution using sodium carbonate and methyl orange indicator.

Place 50 ml of 0.1 M sodium sulfite and three drops of thymolphthalein indicator into a 250-ml Erlenmeyer flask. Titrate the contents of the flask to a colorless endpoint with 0.1 N HCl (usually one or two drops is sufficient). Transfer 0.50 ml of the nominal 25% glutaraldehyde/water solution into the same flask and titrate the mixture with 0.1 N HCl, again, to a colorless endpoint. The glutaraldehyde concentration of the solution may be calculated by the following equation:

$$\text{Glutaraldehyde, mg/ml} = \frac{\text{acid titer} \times \text{acid normality} \times 50.06}{\text{ml of sample}}$$

This method is based on the quantitative liberation of sodium hydroxide when glutaraldehyde reacts with sodium sulfite to form the glutaraldehyde-bisulfite addition product. The volume of sample may be varied depending on the glutaraldehyde content but the solution to be titrated must contain excess sodium sulfite. Glutaraldehyde solutions containing substantial amounts of acid or base must be neutralized before analysis.

3.2.2	Detector	UV detector, 365 nm
3.2.3	Standard(s)	External standard
3.2.4	Interfering substance(s)	Any compound having a similar retention time as the glutaraldehyde-di-DNPH derivative is a potential interference. HPLC parameters (mobile phase composition, column, etc.) may be changed to circumvent interferences. Retention time on a single column is not proof of chemical identity. Analysis using an alternate HPLC column, detection at another

		wavelength, comparison of absorbance response ratios and structure determination by mass spectrometry are additional means of identification.
3.3	**Linearity**	
3.3.1	Calibration range	0.5, 1, and 2 times the TLV target concentration Target concentration: 0.2 ppm (0.8 mg/m^3) (ACGIH TLV-Ceiling)
3.3.2	Number of measurements	6 per concentration
3.3.3	Linearity	The instrument response over the concentration range of 0.5 to 2 times the target concentration is linear.
3.4	**Specifity: interfering substances**	Sampling: Any substance, present in the sampled air, that is capable of reacting with DNPH and thereby depleting the derivatizing reagent is a potential interference. Many aldehydes and ketones are capable of reacting with DNPH.
3.5	**Recovery rates at different levels**	The recovery of glutaraldehyde from samples used in a 17-day storage test was essentially 100% when the samples were stored at about 23°C. The recovery of the analyte from the collection medium during storage must be 75% or greater.
3.5.1	Relative standard deviation	Standard error of estimate at the target concentration: 6.2%
3.6	**Limit of determination**	The detection limit of the analytical procedure is 1.31 ng per injection. The detection limit of the overall procedure is 0.268 µg per sample (4.4 ppb or 18 µg/m^3). The reliable quantitation limit for a 15-l sample is 0.268 µg per sample (4.4 ppb 18 µg/m^3). This is the smallest amount of analyte which can be quantitated within the requirements of a recovery of at least 75% and a precision (+/-1.96 SD) of +/-25% or better. The reliable quantitation limit for a 120-l sample is 0.54 ppb (2.2 µg/m^3) Target concentration: 0.2 ppm (0.8 mg/m^3) (ACGIH TLV-Ceiling) The reliable quantitation limit and detection limits reported in the method are based upon optimization of the instrument for the smallest possible amount of analyte. When the target concentration of an analyte is exceptionally higher than these limits, they may not be attainable at the routine operating parameters.
3.7	**Precision**	
3.7.1	Repeatability	Precision (analytical procedure): The pooled coefficient of variation obtained from replicate determinations of analytical standards at 0.5, 1, and 2 times the target concentration is 0.024. Precision (overall procedure): The precision at the 95% confidence level for the 17-day ambient temperature storage test is +/- 12%. This includes an additional +/- 5% for sampling error. The overall procedure must provide results at the target concentration that are +/- 25% or better at the 95% confidence

Section A4.2b _ 01
Ann. IIA, IV.4.2.

Analytical Method for Detection and Identification of Glutaraldehyde in air

		level.
3.7.2	Independent laboratory validation	Reproducibility (sampling): Six samples, collected from a controlled test atmosphere, and a draft copy of this procedure were given to a chemist unassociated with this evaluation. The samples were analyzed immediately after generation. No individual sample deviated from its theoretical value by more than the 12% precision at the 95% confidence level for the 17-day storage test.
		4 APPLICANT'S SUMMARY AND CONCLUSION
4.1	**Materials and methods**	An air sample is collected by drawing a known volume of air through an open-face air monitoring cassette containing 2 glass-fiber filters, each of which is coated with 2,4-dinitrophenylhydrazine and phosphoric acid. The sample is extracted with acetonitrile and analyzed by HPLC, UV-detection at 365 nm and external standardisation.
4.2	**Conclusion**	Evaluated method. This method has been subjected to the established evaluation procedures of the Organic Methods Evaluation Branch.
4.2.1	Reliability	**1**
4.2.2	Deficiencies	No

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	23 April 2008 Revision post TMIII 2011: The applicant has agreed to submit a modern method.
Materials and methods	Applicant's version is acceptable.
Conclusion	The method is considered valid for the detection and identification of glutaraldehyde in air.
Reliability	1
Acceptability	acceptable
Remarks	
	COMMENTS FROM ...
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

Section A4.2c Ann. IIA, IV.4.2.	Analytical methods in relevant environmental media (c) sediment	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	Technically not feasible [ ] Scientifically unjustified [X]	
Limited exposure [X]	Other justification [ ]	
Detailed justification:	Supported uses for glutaraldehyde based biocides are unlikely to give direct exposure to sediment. Transfer of glutaraldehyde or its metabolites to sediment in natural surface water via waste water sewage effluents is also highly unlikely. Glutaraldehyde is readily biodegradable (Ref 1) and unlikely to persist in the sewage treatment process. Simulation testing has demonstrated that absorption to sewage sludge does not occur (Ref 2). Studies have shown that glutaraldehyde would be rapidly transformed by soil microbial activity under either aerobic (Ref 3) or anaerobic conditions (Ref 4). The DT_{50} for metabolism in aerobic soil was 1.7 days and were all less than 10% of the total [C^{14}]-glutaraldehyde applied (Ref 3). Leung (2001) also confirmed the rapid microbial biotransformation of glutaraldehyde under anaerobic conditions (Ref 5). In soil adsorption/desorption studies, the mobility of glutaraldehyde was found to be high or very high, with one exception (Ref 6). Glutaraldehyde appeared to have less mobility in soil. Due to the high water solubility it can be expected that glutaraldehyde have a high mobility in surface water. However, glutaraldehyde is readily biodegradable and chemical analysis of sediment is scientifically unjustified as persistence or accumulation of glutaraldehyde or its metabolites in sediment is not expected in top or subsediment zones. (1) [redacted] (1993) Determination of the biodegradability or the elimination of [redacted] in the DOC Die Away (ISO 7827)-Test. [redacted] (Unpublished), BPD ID A7.01.1.2.1_01 (2) [redacted] (1998) Determination of the biodegradability of [redacted] in the Activated Sludge Simulation Test according to GLP, EN 45001 and ISO 9002. [redacted] (Unpublished), BPD ID A7.01.2.1.1_01 (3) [redacted] (1986) Aerobic soil metabolism of 14C-glutaraldehyde. [redacted] (Unpublished), BPD ID A7.02.1_01 (4) [redacted] (1986) Anaerobic aquatic metabolism of glutaraldehyde. [redacted] (Unpublished), BPD ID A7.01.2.1.2_01 (5) Leung H-W (2001) Aerobic and anaerobic metabolism of glutaraldehyde in a river water-sediment system. Arch. Environ. Contam. Toxicol. 41: 267-273 (Published), BPD ID A7.01.1.1.1_05(*). (6) [redacted] (1985) Determination of adsorption/desorption constants of 14C-Glutaraldehyde. [redacted] (Unpublished), BPD ID A7.01.3_01 (*)The data reported within this publication are scientifically acceptable as material, method and results were well documented.	
Undertaking of intended data submission [ ]	Not relevant	

Section A4.2c **Ann. IIA, IV.4.2.**	**Analytical methods in relevant environmental media** **(c) sediment**
	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	January 31st, 2011
Evaluation of applicant's justification	Applicant's rationale is acceptable.
Conclusion	Justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.2c
Ann. IIA, IV.4.2.

Analytical Methods for Detection and Identification of Glutaraldehyde in Water

Official use only

1 REFERENCE

1.1	**Reference**	[redacted] (2007) Method Validation for the Determination of Glutaraldehyde in Water. [redacted] BPD ID A4.02c_01
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF AG
1.2.2	Companies with letter of access	[redacted]
1.2.3	Criteria for data protection	Data on new a.s. for first entry to Annex I authorisation

2 GUIDELINES AND QUALITY ASSURANCE

2.1	**Guideline study**	European Commission, Guidance Document on residue analytical methods SANCO/825/00 rev.7
2.2	**GLP**	Yes
2.3	**Deviations**	None

3 MATERIALS AND METHODS

3.1	**Preliminary treatment**	
3.1.1	Enrichment	The derivated samples with internal standard were extracted twice with 2 ml of n-hexane each. The hexane phases were collected.
3.1.2	Cleanup	The collected hexane phases were washed 3 times with hydrochloric acid and dried over sodium sulfate.
3.2	**Detection**	
3.2.1	Separation method	APPARATUS

Capillary gas chromatograph ([redacted]) equipped with split/splitless injector and mass spectrometer detector ([redacted])

REAGENTS AND REFERENCE MATERIALS

- Drinking water
Sampling site: BASF[redacted], sampled on Feb 22, 2007
pH = 8.4, total hardness 13.5 °dH, TOC 1 mg/l

- Surface water "WWS Sammelprobe v. 05.02.07 0 – 24 Uhr"
Sampling site: BASF waterworks south, sampled on Feb 05, 2007
pH = 8.5, total hardness 10.2 °dH, TOC 1 mg/l, silt content 8 mg/l

- Glyoxal, internal standard, solution in water, w = 40.4 g/100 g, [redacted]

Section A4.2c
Ann. IIA, IV.4.2.

Analytical Methods for Detection and Identification of Glutaraldehyde in Water

- O-(2,3,4,5,6-Pentafluorobenzyl)-hydroxylamine hydrochloride (PFBHA), purity > 98 %, [redacted]

- n-Hexane, purity >= 98.5 % [redacted]

- Hydrochloric acid, c(HCl) = 0.1 mol/l, [redacted]

- Sodium sulphate, anhydrous, "reinst", [redacted]

SOLUTIONS[1]

Reagent Solution

PFBHA was dissolved in drinking water.
β(PFBHA) = 10.67 mg/ml

Solution of internal standard

Glyoxal was dissolved in drinking water.
β(Glyoxal) = 356.5 ng/50 µl (concentration of pure glyoxal)

Stock solutions of glutaraldehyde

The test item was dissolved in drinking water.
Stock solution 1: β(glutaraldehyde) = 19.8 mg/100 ml
Stock solution 2: β(glutaraldehyde) = 10.1 mg/100 ml

Calibration solutions

Stock solutions 1 and 2 were diluted with drinking water in order to prepare 6 calibration solutions (CS):
CS 1: β(glutaraldehyde) = 19.8 ng/100 µl
CS 2: β(glutaraldehyde) = 1.98 ng/100 µl
CS 3: β(glutaraldehyde) = 0.198 ng/100 µl
CS 4: β(glutaraldehyde) = 101 ng/100 µl
CS 5: β(glutaraldehyde) = 10.1 ng/100 µl
CS 6: β(glutaraldehyde) = 1.01 ng/100 µl

Factor mixtures

Factor mixtures (FM) were prepared by mixing 20 ml of drinking water or surface water, 100 µl of one of the calibration solutions and 50 µl of the solution of the internal standard.
Finally 6 different factor mixtures were prepared with drinking water

and surface water each.

Test solutions

Test solutions with defined concentrations of glutaraldehyde were prepared as follows.

Test solutions with drinking water

Drinking water was spiked with glutaraldehyde.
Test solution 1 with drinking water: β(glutaraldehyde) = 47.52 ng/l
Test solution 2 with drinking water: β(glutaraldehyde) = 505 ng/l

Test solutions with surface water

Surface water was spiked with glutaraldehyde.
Test solution 1 with surface water: β(glutaraldehyde) = 47.52 ng/l
Test solution 2 with surface water: β(glutaraldehyde) = 505 ng/l

[1] Reagent solution, stock solutions and calibration solutions hat to be prepared twice in the course of the method validation. The concentrations which are given are related to one of the preparations. However, the concentrations of the second preparation were very similar and therefore the exact values are not indicated above.

SAMPLE PREPARATION

50 µl of the solution of the internal standard and 1 ml of reagent solution were added to 20 ml of a test solution. The mixture was heated at 70 °C for 2 h and shaken occasionally. Then it was allowed to cool down. Subsequently it was extracted twice with 2 ml of n-hexane each. The hexane phases were collected, washed 3 times with hydrochloric acid and dried over sodium sulfate.

Factor mixtures were treated similary:
50 µl of the solution of the internal standard and 1 ml of reagent solution was added to a factor mixture.
Derivatization and clean-up were as described above.

CHROMATOGRAPHIC CONDITIONS

Column:	Fused silica capillary:	ZB-5 ms
	Length:	30 m
	Internal diameter:	0.25 mm
	Film thickness:	0.25 µm

Carrier gas: Helium
Constant flow: 1.2 ml/min
Injection: Splitless, duration 0.5 min
Septum purge 3 ml/min

Temperatures: Oven: 50 °C, isothermal for 1 min
50 °C → 320 °C, 10 K/min
320 °C, isothermal for 10 min
Injector: 250 °C

Injected volume: 1 µl

CALCULATIONS

Calibration factor

The calibration factor $CF_{Analyte}$ of the analyte glutaraldehyde is defined as

$$CF_{Analyte} = \frac{A_{Analyte} * m_{IS}}{A_{IS} * m_{Analyte}}$$

$A_{Analyte}$: Peak area of analyte
$m_{Analyte}$: Mass of analyte in factor mixture
A_{IS}: Peak area of internal standard
m_{IS}: Mass of internal standard in factor mixture

$CF_{Analyte}$ is determined by means of linear regression. It is the slope of the regression line with $A_{Analyte}/A_{IS}$ assigned to the ordinate and $m_{Analyte}/m_{IS}$ to the abscissa:

$$\frac{A_{Analyte}}{A_{IS}} = CF_{Analyte} * \frac{m_{Analyte}}{m_{IS}} + b$$

b: intercept of ordinate

Mass concentration of glutaraldehyde

The mass concentration β of the analyte glutaraldehyde is calculated as follows:

$$\left(\frac{A_{Analyte}}{A_{IS}} - b\right) * m_{IS}$$

$$\beta\,(\text{Analyte}) = \frac{}{CF_{\text{Analyte}} * V_S}$$

V_S : Volume of water sample

3.2.2	Detector	MS-Detection: Negative chemical ionization with methane as reactand gas. Individual masses were monitored in selected ion mode (SIM) as follows: Glutaraldehyde: m/z = 450, m/z = 470, m/z = 178 Glyoxal: m/z = 267, m/z = 196, m/z = 167
3.2.3	Standard(s)	Glyoxal, internal standard
3.2.4	Interfering substance(s)	Constituents of the sample with coelute with the analyte and which yield the same ions as selected for glutaraldehyde
3.3	**Linearity**	
3.3.1	Calibration range	Calibration was performed at 6 concentration levels each between 0.01 µg/l and 5.05 µg/l for drinking water and between 0.01 µg/l and 5.25 µg/l for surface water. Linearity was evaluated separately for the whole concentration range, for the lowest 4 concentrations and for the highest 4 concentrations.
3.3.2	Number of measurements	Single determinations at 6 concentration levels each.
3.3.3	Linearity	Matrix: Drinking water 0.01 µg/l – 5.05 µg/l: r^2 = 0.9994 0.01 µg/l – 0.51 µg/l: r^2 = 0.9997 0.10 µg/l – 5.05 µg/l: r^2 = 0.9995 Matrix: Surface water 0.01 µg/l – 5.25 µg/l: r^2 = 0.9991 0.01 µg/l – 0.53 µg/l: r^2 = 0.9995 0.10 µg/l – 5.25 µg/l: r^2 = 0.9991

Section A4.2c
Ann. IIA, IV.4.2.

Analytical Methods for Detection and Identification of Glutaraldehyde in Water

3.4 Specifity: interfering substances

Peaks in the gas chromatogram are assigned to the analyte glutaraldehyde by comparison of retention times and by the selection of characteristic ions in MS-detection. Constituents of the sample with coelute with the analyte and which yield the same ions as selected for glutaraldehyde give rise to excessively high mass fractions. Constituents in the sample having the same retention time as the internal standard and the same ions as selected for glyoxal give rise to underestimates.

Retention times are listed below:

Glyoxal: 18.0 min

Glutaraldehyde: 20.4 min

3.5 Recovery rates at different levels

Drinking water, spiked with 0.048 µg/l glutaraldehyde

Range: 104 % - 115 %

Mean: 109 %

Drinking water, spiked with 0.505 µg/l glutaraldehyde

Range: 93 % - 99 %

Mean: 97 %

Surface water, spiked with 0.048 µg/l glutaraldehyde

Range: 98 % - 123 %

Mean: 111 %

Surface water, spiked with 0.505 µg/l glutaraldehyde

Range: 101 % - 107 %

Mean: 103 %

3.5.1 Relative standard deviation

Drinking water :

SD = 4 (mean recovery 109 %)

SD = 2 (mean recovery 97 %)

Surface water:

SD = 10 (mean recovery 111 %)

SD = 2 (mean recovery 103 %)

3.6 Limit of determination

The limits of quantification (LOQ) were estimated based on the calibrations at the lowest concentration levels. It was taken into account that the LOQ should exceed the blank by a factor of about 3.

The limits of detection (LOD) were calculated as follows:
LOD = 0.3 * LOQ

LOQ (Drinking water): 0.05 µg/l LOD (Drinking water): 0.015 µg/l

LOQ (Surface water): 0.05 µg/l LOD (Surface water): 0.015 µg/l

3.7 Precision

3.7.1 Repeatability

2 Test solutions each of glutaraldehyde in drinking water and surface water were prepared in order to determine accuracy and precision of the method. These solutions were analysed 6 times each.

Drinking water, spiked with 0.048 µg/l glutaraldehyde

Arithmetic mean of analytical values [µg/l]: 0.052

Standard deviation [µg/l]: 0.0020

Relative standard deviation 3.8 %

Measurement uncertainty [µg/l]: 0.0060

		Relative measurement uncertainty 11.5 %
		Drinking water, spiked with 0.505 µg/l glutaraldehyde
		Arithmetic mean of analytical values [µg/l]: 0.49
		Standard deviation [µg/l]: 0.012
		Relative standard deviation 2.4 %
		Measurement uncertainty [µg/l]: 0.036
		Relative measurement uncertainty 7.3 %
		Surface water, spiked with 0.048 µg/l glutaraldehyde
		Arithmetic mean of analytical values [µg/l]: 0.053
		Standard deviation [µg/l]: 0.0049
		Relative standard deviation 9.2 %
		Measurement uncertainty [µg/l]: 0.0147
		Relative measurement uncertainty 27.7 %
		Surface water, spiked with 0.505 µg/l glutaraldehyde
		Arithmetic mean of analytical values [µg/l]: 0.52
		Standard deviation [µg/l]: 0.012
		Relative standard deviation 2.3 %
		Measurement uncertainty [µg/l]: 0.036
		Relative measurement uncertainty 6.9 %
3.7.2	Independent laboratory validation	Not in this study.

4 APPLICANT'S SUMMARY AND CONCLUSION

4.1	**Materials and methods**	Oximation of glutaraldehyde with PFBHA, extraction with n-hexane, analysis of the extract with GC/MS (negative chemical ionization), quantification with glyoxal as internal standard.
4.2	**Conclusion**	The validation results confirm that the method is well suited to determine residues of glutaraldehyde in drinking water and surface water at a level of 0.05 – 5.05/5.25 µg/l.
4.2.1	Reliability	1
4.2.2	Deficiencies	No

Section A4.2c
Ann. IIA, IV.4.2.

Analytical Methods for Detection and Identification of Glutaraldehyde in Water

Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	28 May 2008
Materials and methods	Applicant's version is acceptable.
Conclusion	The validation results confirm that the method is well suited to determine residues of glutaraldehyde in drinking water and surface water at a level of 0.05 – 5.05/5.25 µg/l.
Reliability	1
Acceptability	acceptable
Remarks	Analytical method for detection and identification of glutaraldehyde in natural sediment is missing.
	COMMENTS FROM ...
Date	*Give date of comments submitted*
Results and discussion	*Discuss additional relevant discrepancies referring to the (sub)heading numbers and to applicant's summary and conclusion.* *Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Reliability	*Discuss if deviating from view of rapporteur member state*
Acceptability	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.3 **Ann. IIIA, IV.1.**	**Analytical methods including recovery rates and the limits of determination for the active substance, and for residues thereof, in/on food or feedstuffs and other products where relevant**	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [X]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	The product is not intended to be added to food and feedstuffs or be used in facilities during food processing. Hence, only by accident may trace amounts of glutaraldehyde be on the surface of food and feedstuffs. Due to its high volatility (vapor pressure: 20 hPa at 20 °C; see section A3.2), the substance is expected to evaporate quickly. Any remains will react with proteins contained in the food and feedstuffs in a matter of minutes to hours. Photodegradation of glutaraldehyde, which takes place with a half-life of about 2.8 h, will additionally deplete the substance (see section A7.3.1). It is therefore scientifically unjustified to establish an analytical method.	
Undertaking of intended data submission [ ]		
	Evaluation by Competent Authorities	
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	15 May 2008	
Evaluation of applicant's justification	Analytical method for residues in/on food or feedstuffs and other products where relevant is always required for product types 4, 5 and 20. However due to properties of glutaraldehyde justification is correct.	
Conclusion	Applicant's justification is acceptable.	
Remarks		
	COMMENTS FROM OTHER MEMBER STATE *(specify)*	
Date	*Give date of comments submitted*	
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*	

Section A4.3 Ann. IIIA, IV.1.	**Analytical methods including recovery rates and the limits of determination for the active substance, and for residues thereof, in/on food or feedstuffs and other products where relevant**
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A4.2d Ann. IIA, IV.4.2.	**Analytical methods including recovery rates and the limits of determination for the active substance, and for residues thereof, and where relevant in/on the following:** **(d) Animal and human body fluids and tissues**	
	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible** [ ] **Scientifically unjustified** [X]	
Limited exposure [ ]	**Other justification** [ ]	
Detailed justification:	Two methods have been established for the quantification of glutaraldehyde from animal derived biological samples (1, 2). Total radioactivity has been used in two toxicokinetics studies and was backed up by a gas chromatography tandem mass spectrometry (GC/MS/MS) method that has a limit of quantitation of 0.02 µg glutaraldehyde/g rat blood. The radioactive method, however, is obviously not suitable for the use in humans or for a routine detection of glutaraldehyde. Prior to quantification of glutaraldehyde by the GC/MS/MS method, the molecule has to be derivatized with pentafluorobenzyl hydroxylamine to avoid the formation of glutaraldehyde oligomers, which cannot be quantified easily. This method may be used in the case of animal body fluids and tissues and could be established for human body fluids and tissues. However, toxicokinetics studies (1, 2) have shown that glutaraldehyde is rapidly eliminated via the feces and expired air. In fact, following the initial half-life of elimination from blood of 30 min, which represents the distribution phase, glutaraldehyde was no longer quantifiable in rat blood 2 h post dosing at 5 mg/kg b.w. and was eliminated with a terminal half-life of 6 h at 75 mg/kg b.w. (2). In addition, glutaraldehyde was rapidly metabolized and a fair amount was excreted as CO_2 (ca. 20% following single oral administration) of which most was recovered within the first twelve hours after dosing (1). This rapid elimination and the elimination pathway indicate that bio-monitoring following an eight hour shift may not yield representative values for body fluids and tissues, rendering the development of additional analytical methods unjustified (see section A6.2). (1) [redacted] (2004), Report on ^{14}C-GDA - Study of the biokinetics in rats [redacted] (Unpublished), BPD ID A6.02_01 (2) [redacted] (2004) Glutaraldehyde: pharmacokinetics in [redacted] rats following oral gavage or dermal application. [redacted] (unpublished), ([redacted]), BPD ID A6.02_02	
Undertaking of intended data submission [ ]		

Section A4.2d **Ann. IIA, IV.4.2.**	**Analytical methods including recovery rates and the limits of determination for the active substance, and for residues thereof, and where relevant in/on the following:** **(d) Animal and human body fluids and tissues**
	Evaluation by Competent Authorities
	Use separate "evaluation boxes" to provide transparency as to the comments and views submitted
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	23 April 2008
Evaluation of applicant's justification	According to scientific studies glutaraldehyde is rapidly eliminated and metabolized indicating that bio-monitoring may not yield representative values for body fluids and tissues.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

Section A5.3.1_03 Efficacy Data

			Official use only
		1 REFERENCE	
1.1	**Reference**	Alkalinized Glutaraldehyde, A new antimicrobial., Borick P.M. et al, Journal of Pharmaceutical Sciences Vol. 53, No 10, Report Ref: BPD ID A5.3.1_03, Publication Date October 1964	
1.2	**Data protection**		
1.2.1	Data owner	Unknown	
1.2.2	Companies with letter of access	None	
1.2.3	Criteria for data protection	None	
1.3	**Guideline study**	The study was designed to assess the bactericidal, mycobactericidal. fungicidal, sporicidal and virucidal efficacy of alkalinized glutaraldehyde in the presence of interfering substances. The antibacterial activity was assessed using the modified use-dilution technique of Ortenzio and Stuart (see below). This method involved the drying of inoculum onto penicylinders and can therefore be considered to be assessing efficacy on surfaces.	x
1.4	**Deviations**	Unknown	
		2 METHOD	
2.1	**Test Substance (Biocidal Product)**	Glutaraldehyde, alkalised by the addition of 0.3% sodium bicarbonate to 2.0% aqueous glutaraldehyde solution	
2.1.1	Trade name/ proposed trade name	None	
2.1.2	Composition of Product tested	2.0%, 1.7%, 1.5%, 1.4%, and 0% solutions of glutaraldehyde active substance	
2.1.3	Physical state and nature	Solution	
2.1.4	Monitoring of active substance concentration	Yes, by the bisulfite iodometric technique (Siggin "Quantitative Organic Analysis Via Functional Groups", Wiley, NY, 1950, p10.	
2.1.5	Method of analysis	(1) Bactericidal Efficacy Method according to Ortenzio *et al, J.Assoc. Off. Agr. Chemists,* 44, 416 (1961), modified by the use of Penicylinders. Test organisms were dried onto the Penicylinder prior to testing, producing a surface test. (2) Mycobactericidal Efficacy Method involved the biocide treatment of mycobacteria which were then inoculated onto slants and inoculated into Guineapigs. The animals	

		were sacrificed at 6 weeks and examined for tubercule lesions. (3) Sporicidal Efficacy Method used was AOAC Sporicidal Method (1963) modified to include both a reference standard and penicylinders to investigate surface activity. (4) Fungicidal Efficacy Method as according to Official Agricultural Chemists (1960) (5) C Activity was determined according to the method reported by Klein, 1963	x
2.2	**Reference substance**	No, with the exception of (3) Sporicidal activity	
2.2.1	Method of analysis for reference substance	Where use (see 2.2 above) then by the bisulfite iodometric technique (Siggin "Quantitative Organic Analysis Via Functional Groups", Wiley, NY, 1950, p10.	
2.3	**Testing procedure**		
2.3.1	Test population / inoculum / test organism	(1) Bactericidal Activity *Staphylococcus aureus* ATCC 6538; *Staphylococcus aureus* – penicillin resistant; *Streptococcus pyogenes* ATCC 12384; *Diplococcus pneumoniae*; *Escherichia coli* ATCC 6880; *Pseudomonas aeruginosa* ATCC 10145; *Proteus vulgaris* ATCC 6380; *Klebsiella pneumoniae* ATCC 132 (2) Mycobactericidal Activity *Mycobacterium tuberculosis* ATCC 7690 (3) Fungicidal Efficacy *Trichophyton interdigitale* ATCC 640 (4) Sporicidal Activity *Bacillus globigii; Bacillus subtilis; Clostridium tetani; Clostridium perfringens* (5) Virucidal Efficacy Poliomyelitis virus types I and II; Coxasackie virus B-1; Echo 6: Herpes simplex; Vaccinia; Influenza A-2 Asian; Adeno virus type 2; Mouse	x x

hepatitis virus; MHV-3;

2.3.2 Test system

(1) Bactericidal Efficacy

The efficacy was determined by the modified use dilution method of Ortenzio et al. This technique employs polished stainless steel cylinders as carriers of the inoculum. After determining that each test organism had a uniform resistance to phenol, the inoculum was dried onto the cylinders. The contaminated cylinders were then immersed in 10ml of the test substance and, after pre-determined exposures, transferred to 40ml of eugonbroth (BBL) for incubation at 37C for 48 hours. All negative broth tubes were challenged for bacteriostasis by reinoculation.

(2) Mycobactericidal Efficacy

Alkalinized solutions of Glutaraldehyde were tested on a human strain of *M. tuberculosis* by exposing approx a 1 x 10^5 /ml culture to test solution for 10 minutes at 30C.This was followed by direct injection into the glands of Guinea pigs, and onto agar slants. The slants were incubated at 37C for 4 weeks, The guinea pigs were sacrificed after 6 weeks and all involved organs were examined for tubercle lesions.

(3) Sporicidal Efficacy

Method used was AOAC Sporicidal Method (1963) modified to include both a reference standard and penicylinders to investigate surface activity.

(4) Fungicidal Efficacy

Method as according to Official Agricultural Chemists (1960)

(5) Virucidal Efficacy

Activity was determined according to the method reported by Klein, 1963 x

2.3.3 Application of TS

The test systems contained the final concentrations of the active substance Glutaraldehyde detailed as follows:

2.0%, 1.7%, 1.5%, 1.4%, and 0%

2.3.4 Test conditions

The test temperatures were as follows:

(1) Bactericidal Efficacy 37C

(2) Mycobactericidal Efficacy 37C

(3) Sporicidal Efficacy 20C

(4) Fungicidal Efficacy 25C

(5) Virucidal Efficacy Unknown x

2.3.5	Duration of the test / Exposure time	The exposure times were : (1) Bactericidal Efficacy <1 minute reported (2) Mycobactericidal Efficacy 10 minutes (3) Sporicidal Efficacy <3 hours reported (4) Fungicidal Efficacy <0.5 minutes, 2-5 minutes reported (5) Virucidal Efficacy <10 minutes reported
2.3.6	Number of replicates performed	Unknown
2.3.7	Controls	Controls not reported
2.4	**Examination**	
2.4.1	Effect investigated	Kill
2.4.2	Method for recording / scoring of the effect	In all cases, a positive result was "no recovery of test organisms"
2.4.3	Intervals of examination	See 2.3.5 above
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None
		3 RESULTS
3.1	**Efficacy**	The test did not allow for measured degrees of efficacy and was scored on a "Pass/FAIL" basis, the criteria for which were "No Recovery of Test Organisms"
3.1.1	Dose/Efficacy curve	Not applicable
3.1.2	Begin and duration of effects	The effects were observed within 0,5 minutes (fungicidal activity and 3 hours (sporicidal activity) - See 2.3.5 above Duration was recorded as follows: (1) Bactericidal Efficacy At least 4 weeks (2) Mycobactericidal Efficacy Not Reported (3) Sporicidal Efficacy At least 8 weeks (4) Fungicidal Efficacy Not Reported (5) Virucidal Efficacy Not Reported

x

3.1.3	Observed effects in the post monitoring phase	There was no post monitoring phase reported.
3.2	**Effects against organisms or objects to be protected**	No adverse effects were reported
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	A reference substance was not tested
3.5	**Tabular and/or graphical presentation of the summarised results**	**(1) Bactericidal Efficacy**

Bactericidal Activity of Aqueous, Alkalinised 2% Glutaraldehyde Solutions

Challenge time point	**Immediate activation**	**2 weeks post 4 weeks post activation**		
No Samples Tests	**11**	**11**	**5**	
Mean pH	**8.3**	**7.9**	**7.7**	
Mean % glutaraldehyde content		**2.02**	**1.71**	**1.50**
Organism	**Killing time in minutes**			
S. aureus	**<1**	**<1**	**<1**	
S.aureus – penicillin resistant		**<1**	**<1**	**<1**
Str. pyogenes	**<1**	**<1**	**<1**	
D. pneumoniae	**<1**	**<1**	**<1**	
E. coli	**<1**	**<1**	**<1**	
Ps. aeruginosa	**<1**	**<1**	**<1**	
P. vulgaris	**<1**	**<1**	**<1**	
K. pneumoniae	**<1**	**<1**	**<1**	

(2) Mycobacterial Efficacy

Tuberculocidal Activity of Aqueous, Alkalinised 2% Glutaraldehyde Solutions

	M. tuberculosis Growth	
	Media Slant	Guinea Pig
2% Aqueous Glutaraldehyde	No Growth	No Growth, No Lesions
Aqueous Control	Growth + lesions	Growth + lesions
Saline Control	Growth + lesions	Growth + lesions

(3) Sporicidal Control

Sporicidal Action of Aqueous, Alkalinised 2% Glutaraldehyde Solutions

	Post Activation Challenge Point				
	Immediate	2 weeks	4 weeks	6 weeks	8 weeks
Samples	11	11	5	4	2
pH	8.3	7.9	7.7	7.7	7.7
% glutaraldehyde	1.4	2.0	1.8	1.5	1.4
	Killing Time - Hours				
B. globigii	<3	<3	<3	<3	<3
B. subtilis	<3	<3	<3	<3	<3
Cl. tetani	<3	<3	<3	<3	<3
Cl. perfringens	<3	<3	<3	<3	<3

(4) Fungicidal Control

Fungicidal Action Aqueous, Alkalinised 2% Glutaraldehyde Solutions

Samples	5
pH	7.8
% glutaraldehyde	1.41
	Killing Time - Minutes
T. interdigitale	<0.5
Phenol 1:60 control	3-5

(5) Virucidal Control

Virucidal Action of Aqueous, Alkalinised 2% Glutaraldehyde Solutions

Virus inhibition	Activity – Time to complete
Poliomyelitis virus types I and II	**<10 minutes**
Coxasackie virus B-1	**<10 minutes**
Echo 6	**<10 minutes**
Herpes simplex	**<10 minutes**
Vaccinia	**<10 minutes**
Influenza A-2 Asian;	**<10 minutes**
Adeno virus type 2	**<10 minutes**
Mouse hepatitis virus; MHV-3	**<10 minutes**

3.6	**Efficacy limiting factors**	None Recorded
3.6.1	Occurrences of resistances	None Recorded
3.6.2	Other limiting factors	None Recorded

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1	**Reasons for laboratory testing**	The temperatures, contact times and soil loadings (bovine serum) were chosen as typical and representative of field conditions in clinical environments.
4.2	**Intended actual scale of biocide application**	The testing was carried out using intended use dilutions into test conditions recognised as acceptable for the field of use (see 4.1 above).
4.3	**Relevance compared to field conditions**	-
4.3.1	Application method	In the field, the biocidal product would be applied in a liquid medium, the target organisms would be resuspended and kill would take place in such a medium. Surface testing was included in the form of Stainless Steel Penicylinders
4.3.2	Test organism	The test organisms were relevant to the field of use, one being a clinical isolate. Animal Viruses, for example Mouse Hepatitis were also **x**

		included	
4.3.3	Observed effect	The observed effect has been achieved under conditions similar to those expected in the field and therefore it is reasonable to assume that the effect is similar to that which would be observed in the field.	
4.4	**Relevance for read-across**	No	
		5 APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The test methods used were relevant to the envisaged field of use. The concentrations tested were similar to actual biocidal products used in the field.	
5.2	**Reliability**	Not tested.	
5.3	**Assessment of efficacy, data analysis and interpretation**	The results showed that the active substance, glutaraldehyde, could be employed at levels similar to those expected in the field. The results showed that the substance was active against organisms relevant to the field under conditions expected in the field.	
5.4	**Conclusion**	The test conditions of typical contact times reflect well the conditions expected in the field and therefore in-situ efficacy can be estimated as similar to the efficacy exhibited in the test.	**x**
5.5	**Proposed efficacy specification**	The close relevance of the test with respect to the field of application allows for the proposed efficacy specification to be 100% as found in the test	**x**

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Key study	Alkalinized Glutaraldehyde, A new antimicrobial. Borick P.M. et al, Journal of Pharmaceutical Sciences Vol. 53, No 10, Report Ref: BPD ID A5.3.1_03, Publication Date October 1964
Date	August 31, 2009
Comments	
Materials and methods Points 1.3, 2.1.5, 2.3.2, 2.3.4 Tables 1.1, 1.2, 1.3, 1.4 and 1.5	The study was designed to assess the bactericidal, mycobactericidal. fungicidal, sporicidal and virucidal efficacy of alkalinized glutaraldehyde in the presence of interfering substances (bovine serum).
Bactericidal efficacy	The guideline study referred in bactericidal efficacy assessment is based on a modified used-dilutions technique using four strains of Gram positive and four strains of Gram negative bacteria as the target organisms. The tests were conducted both under clean and soiled conditions. The age of all inoculated target organisms was relatively high, more than 48h, and thus the viability most probably reduced. Target strains were dried onto the test surface of stainless steel cylinders. Neither the inoculum size nor the effect of drying on the inoculum was reported. No information was provided about blank or other controls. Due to these shortcomings/gaps in method description, the evidence provided of bactericidal efficacy on surfaces is limited to indication of efficacy only. As a fully relevant surface test method the method of Ortenzio&Stuart cannot be considered.
Mycobactericidal efficacy	No guideline study was referred. According to the original study report, the method used in the testing of mycobactericidal activity was based on a personal communication reference. Only a few variables of the method were given. Information provided about the test system was not sufficient for evaluating the appropriateness of the assessment.
Sporicidal efficacy	In the AOAC method referred as the guideline study two *Bacillus* and two *Clostridium* strains were used as the target organisms. The tests were conducted both under clean and soiled conditions. Sporicidal action was detected in less than 3 h. In accordance with ISO 13704 a 10^3 cfu/ml reduction would be required within 60 min for evidence of sporicidal activity. Still, the method applied can be considered acceptable.
Fungicidal efficacy	AOAC method was referred as the guideline study. The tests were conducted both under clean and soiled conditions. Only one *Trichophyton* strain was used as the target organism.
Virucidal efficacy	No guideline study was referred, and the method description is very narrow. Only a personal communication was given for the reference, and the only test variables reported were the names of target viruses. Within veterinary application field, *Bovine enterovirus* Type 1 is currently recommended for a primary test organism representing clinically important *Picorna* virus species (for reference see ISO 14675:2006). It was not included in the virus set applied in assessment. The evidence of virucidal activity shown by the original study is not sufficient. A more updated and solid key study is essentially needed for evidence of virucidal activity.
Results and their relevance Point 4.3.2	Today *Bovine enterovirus* Type 1 is considered as a more relevant target virus than Mouse Hepatitis virus in tests for showing evidence of virucidal efficacy of a biocide, in veterinary environments.

Evaluation by Competent Authorities	
Reliability Point5.2	Bactericidal efficacy, sporicidal efficacy and fungicidal efficacy: 2 Mycobactericidal efficacy and virucidal efficacy: 3
Conclusion Point 5.4	The conclusion presented by the applicant is suggested to be replaced by the following version: On the basis of results obtained 2% alkaline glutaraldehyde indicates bactericidal activity against vegetative bacteria in less than 1 min, sporicidal activity in less than 3 h, and fungicidal activity in less than 0.5 min both under clean conditions and conditions challenged by organic load. The test conditions of typical contact times reflect well the conditions expected in the field and therefore in-situ efficacy can be estimated as similar to the efficacy exhibited in the test.
Proposed efficacy specification Point 5.5	The specification presented by the applicant is too unspecific and is suggested to be changed: 2% alkaline glutaraldehyde indicates bactericidal activity against vegetative bacteria in less than 1 min, sporicidal activity in less than 3 h, and fungicidal activity in less than 0.5 min both under clean conditions and soiled conditions.
Acceptability	
Bactericidal efficacy	Acceptable
Mycobactericidal efficacy	Not acceptable
Sporicidal efficacy	Acceptable
Fungicidal efficacy	Acceptable
Virucidal efficacy	Not acceptable
Remarks	
	Throughout the report, the percentage values of concentrations given should specify whether they relate to weight or volume percentages. SI units should be used in the summary report (ppm → mg/l, sec →s, minute → min, hour → h, mL →ml, ft → m, oz → g, °F →°C, bar → MPa etc.).
	COMMENTS FROM ... *(specify)*
Date	*Give date of comments submitted*
Comments	*Discuss if deviating from view of rapporteur member state*
Summary and conclusion	*Discuss if deviating from view of rapporteur member state*

Tables for Method

I.1 (mixed) Population / Inoculum (*if necessary; include separate table for different samples*)

Criteria	Details
Nature	Bacteria, Mycobacteria, Sporing bacteria, Fungi, Viruses
Origin	Culture Collections and Clinical isolates
Initial biomass	Not known
Reference of methods*	In house quantitative suspension test
Collection / storage of samples*	Not known
Preparation of inoculum for exposure*	Not known
Pretreatment*	Not known
Initial density of test population in the test system*	Individual cultures

I.2 Test organism (*if applicable*)

Criteria	Details
Species	See 2.3.1 above
Strain	See 2.3.1 above
Source	Culture Collections and Clinical isolates
Laboratory culture	YES
Stage of life cycle and stage of stadia*	Not reported
Mixed age population	No
Other specification	None
Number of organisms tested*	As in initial density (1.2) above
Method of cultivation*	Not reported
Pretreatment of test organisms before exposure*	None
Initial density/number of test organisms in the test system*	As in initial density (1.2) above

1.3 Test system *

Criteria	Details
Culturing apparatus / test chamber	*See 2.3.2 above*
Number of vessels / concentration	Not reported
Test culture media and/or carrier material	*See 2.3.2 above*
Nutrient supply	*See 2.3.2 above*
Measuring equipment	*See 2.3.2 above*

1.4 Application of test substance *

Criteria	Details
Application procedure	*See 2.3.2 above*
Delivery method	Not reported
Dosage rate	*See 2.3.3 above*
Carrier	*See 2.3.2 above*
Concentration of liquid carrier	Not known
Liquid carrier control	Not reported
Other procedures	None reported

1.5 Test conditions *

Criteria	Details
Substrate	Sterile Distilled Water
Incubation temperature	*See 2.3.2 above*
Moisture	Not reported
Aeration	Not reported
Method of exposure	individual subsamples
Aging of samples	None
Other conditions	Not reported

Section A5.3.1_11 Efficacy Data

Official use only

1 REFERENCE

1.1	**Reference**	An Investigation into the Efficacy of [redacted] ([redacted]% Glutaraldehyde) as a Disinfectant in Veterinary and Animal Husbandry Applications, [redacted], BPD ID A5.3.1_11, Unpublished, Non GLP.
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF
1.2.2	Companies with letter of access	None
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]
1.3	**Guideline study**	BS EN 1656, BS EN 1657
1.4	**Deviations**	No

2 METHOD

2.1	**Test Substance (Biocidal Product)**	Glutaraldehyde ([redacted]). [redacted]% aqueous Glutaraldehyde active substance
2.1.1	Trade name/ proposed trade name	[redacted]
2.1.2	Composition of Product tested	The test methodology is designed to determine the efficacy of finished formulations. The test substance was therefore incorporated into such a formulation frame as detailed : [redacted] Sterile Distilled Water 46%
2.1.3	Physical state and nature	Solution
2.1.4	Monitoring of active substance concentration	No
2.1.5	Method of analysis	BS EN 1656 and BS EN 1657 are Quantitative Suspension Tests. For BS EN 1656 a 1.5 – 5.0 x 10^8 cfu/ml inoculum of each of the following organisms was employed: [redacted]

Test temperature was 10°C (±1°C)

Contact times were: 30 minutes (compulsory) and 5 minutes.

Product (frame formulation) diluent was: Hard Water

Organic load was:

Clean conditions – Bovine albumin 3.0g/litre

Dirty conditions – Bovine albumin 10.0g/litre + Yeast extract 10.0g/litre

The final concentrations of the Frame Formulation (and the active substance Glutaraldehyde) were as follows:

[redacted]

Criteria for passing the test: at least a 5 $\log_{10}$ reduction

For BS EN 1657 a 1.5 – 5.0 x 10^7 cfu/ml inoculum of each of the following organisms was employed:

[redacted]

Test temperature was 10°C (±1°C)

Contact times were: 30 minutes (compulsory) and 5 minutes.

Product (frame formulation) diluent was: Hard Water

Organic load was:

Clean conditions – Bovine albumin 3.0g/litre

Dirty conditions – Bovine albumin 10.0g/litre + Yeast extract 10.0g/litre

The final concentrations of the Frame Formulation (and the active substance Glutaraldehyde) were as follows:

[redacted]

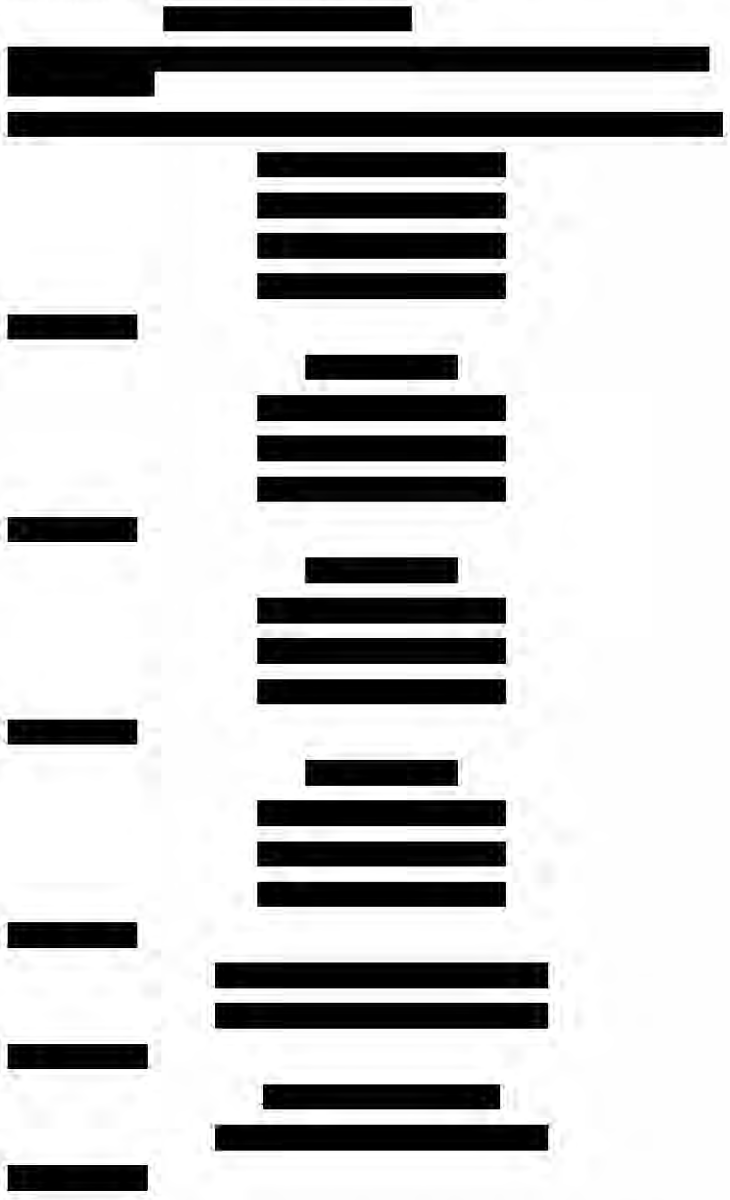
Criteria for passing the test: at least a 4 $\log_{10}$ reduction

2.2	**Reference substance**	No
2.2.1	Method of analysis for reference substance	Not tested

2.3	**Testing procedure**		
2.3.1	Test population / inoculum / test organism	For BS EN 1656 [redacted] For BS EN 1657 [redacted]	
2.3.2	Test system	For both BS EN 1656 and BS EN 1657: Quantitative Suspension Test	
2.3.3	Application of TS	The test systems contained the final concentrations of the Frame Formulation (and the active substance Glutaraldehyde) detailed as follows: 0 [redacted]	x
2.3.4	Test conditions	For both BE EN 1656 and BS EN 1657 the test temperature was 10°C (±1°C)	
2.3.5	Duration of the test / Exposure time	For both BE EN 1656 and BS EN 1657 the exposure times were 30 minutes (compulsory) and 5 minutes.	
2.3.6	Number of replicates performed	One	
2.3.7	Controls	The test does not require "untreated controls".	x
2.4	**Examination**		
2.4.1	Effect investigated	Kill	x
2.4.2	Method for recording / scoring of the effect	Scoring is achieved by subtracting the number of survivors from the initial inoculum. A resulting differential greater than 5 log (BS EN 1656) and greater than 4 log (BS EN 1657) is recorded as a "PASS"	x
2.4.3	Intervals of examination	5 minutes and 30 minutes	
2.4.4	Statistics	None	
2.4.5	Post monitoring of the test organism	None	
		3 RESULTS	
3.1	**Efficacy**	The tests do not allow for measured degrees of efficacy and are on a "Pass/FAIL" criteria based. These are described as greater than 5 log (1656) or 4 log (1657) after 30 minutes exposure. The additional exposure time of 5 minutes gives an indication of a measured degree of	

		efficacy. The observed difference between clean and dirty conditions (soil level) may also give an indication of a measured degree of efficacy. BS EN 1656 – The biocidal product (the frame formulation) PASSED the test (reduced each test organism by at least five logs, when exposed for thirty minutes under both clean and dirty conditions) when employed in the test system at a concentration of [redacted] It was equally effective after 5 minutes exposure as it was after 30 minutes. Of the test organisms [redacted] BS EN 1657 - The biocidal product (the frame formulation) PASSED the test (reduced each test organism by at least four logs, when exposed for thirty minutes under both clean and dirty conditions) when employed in the test system at a [redacted]
3.1.1	Dose/Efficacy curve	Not applicable
3.1.2	Begin and duration of effects	BS EN 1656 - The effects against target bacteria were observed within 5 minutes and continued throughout. BS EN 1657 - The effects against target yeasts and moulds were observed after 30 minutes exposure
3.1.3	Observed effects in the post monitoring phase	There was no post monitoring phase
3.2	**Effects against organisms or objects to be protected**	No adverse effects were observed
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	The reference substance was not tested

3.5	**Tabular and/or graphical presentation of the summarised results**	Test Organisms (see 2.3.1 above) In test concentration of formulation (a.s. glutaraldehyde in parentheses) required to "PASS" EN 1656 and EN 1657



3.6	**Efficacy limiting factors**	Organic soil had an influence on performance but not sufficient influence to prevent a "PASS" result being observed and recorded
3.6.1	Occurrences of resistances	There was no evidence or observance of resistance
3.6.2	Other limiting factors	None observed

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1	**Reasons for laboratory testing**	Both BS EN 1656 and BS EN 1657 are recognised as standard tests for determining the efficacy of biocidal products for use in the Veterinary industry. The temperature (10°C), contact time (30 minutes) and soil loadings are all designed to simulate In-Use application.
4.2	**Intended actual scale of biocide application**	The testing was carried out using intended use dilutions into test conditions recognised as acceptable for the field of use (see 4.1 above).
4.3	**Relevance compared to field conditions**	-
4.3.1	Application method	Both BS EN 1656 and BS EN 1657 are recognised as standard tests for determining the efficacy of biocidal products for use in the Veterinary industry. In the field, the biocidal product would be applied in a liquid medium, the target organisms would be resuspended and kill would take place in such a medium.
4.3.2	Test organism	In both BS EN 1656 and BS EN 1657 the test organisms have been defined as relevant to the field of use
4.3.3	Observed effect	The observed effect has been achieved under conditions similar to those expected in the field and therefore it is reasonable to assume that the effect is similar to that which would be observed in the field.
4.4	**Relevance for read-across**	Yes The frame formulation is similar to disinfectant formulations used in PT 2 and 4. The organisms are also relevant to PT 2 and 4. The soil conditions are extreme (10x higher than those found in PT 2 and 4) and the low temperature that the test is carried out at is useful for such PT2 and 4 areas involving food production.

5 APPLICANT'S SUMMARY AND CONCLUSION

5.1	**Materials and methods**	The chosen test methods, BS EN 1656 and 1657 are the standard methods for determining the efficacy of biocidal products for use in the veterinary field. The frame formulation used is similar to actual biocidal products used in the field.
5.2	**Reliability**	The BS EN test methods were chosen as peer developed methods where reliability was part of the design criteria
5.3	**Assessment of efficacy, data analysis and interpretation**	The results showed that the active substance, glutaraldehyde, could be employed in a basic frame formulation that in turn could then be used at levels similar to those expected in the field. The results showed that the substance was active against organisms relevant to the field under conditions (temperature, exposure and soil) expected in the field.
5.4	**Conclusion**	According to the EN 1656, the biocidal product (the frame formulation) was equally effective against vegetative bacteria under both clean and soiled conditions when employed in the test system [redacted] According to the EN 1657, the biocidal product (the frame formulation) was equally effective against yeasts and moulds under both clean and soiled conditions when employed in the test system [redacted]

(ppm)] after a treatment for 30 min.

5.5	**Proposed efficacy specification**	The biocidal product (the frame formulation) is effective against vegetative bacteria, yeasts and moulds both under clean and soiled conditions. After a treatment of 30 min, the effective concentration [redacted] Against yeasts and moulds, respectively, the effective concentration [redacted]	x

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER
Key study	An investigation into the efficacy [redacted]% Glutaraldehyde) as a disinfectant in veterinary and animal husbandry applications, [redacted], BPD ID A5.3.1_11, Unpublished, Non GLP.
Date	January 9, 2009
Comments	
Materials and methods	The biocidal product (the frame formulation) was tested for bactericidal and fungicidal activity by suspension tests according to the methods of EN 1656 and EN 1657, with minor deviations. The tests were conducted at 10°C, both under clean and heavy duty conditions simulating soiled conditions typical especially within veterinary and animal husbandry application field. The studies were conducted mainly in compliance with the guideline study. However, the original study report does not provide all crucial key information about the testing procedure applied.
Points 2.1.5 and 2.3.3 Table 1.4	The biocidal product tested contained [redacted] It was diluted in hard water. Although in the study summary, the concentration levels of the active substance tested were reported, this information was lacking from the original study report.
Points 2.3.4, 2.4.1 and 2.4.2 Table 1.5	Moreover, the original study report did not provide any information about the neutralization procedure of the active substance applied after the treatment, nor validation data of that. Without evidence of proper neutralization, the results obtained can not be considered fully reliable.
Point 2.3.7	According to EN 1656 and EN 1657, in efficacy testing control samples should always be included for assessing neutralizer toxicity, dilution-neutralization and experimental conditions. In the original study report, no data was provided whether these controls were used for the verification of the methodology and validation of the dilution neutralization method. If control samples were tested according to the guideline studies, this should be reported under point 2.3.7.
Results and their relevance	In the original study report, the results obtained were not presented in compliance with the guideline studies EN 1656 and EN 1657. Primary results, i.e. log reduction values at each concentration level have been omitted. Only concentrations meeting the passing criteria have been reported. Without primary results given in the original report, consistent evaluation of the original study is not possible.
Point 3.5	
Point 4.4	The arguments presented for the relevance of results are agreeable. However, as efficacy assessment was solely based on suspension tests, read-across of results e.g. for surface disinfection applications is to some extent restricted.
Reliability	[redacted]

	Evaluation by Competent Authorities
Conclusion Point 5.4	The conclusion presented by the applicant is not fully relevant and is therefore suggested to be replaced by the following version: According to the EN 1656, the biocidal product (the frame formulation) was equally effective against vegetative bacteria under both clean and soiled conditions when employed in the test system at a concentration [redacted] According to the EN 1657, the biocidal product (the frame formulation) was equally effective against yeasts and moulds under both clean and soiled conditions when employed in the test system at a concentration [redacted]
Proposed efficacy specification Point 5.5	The specification presented by the applicant is too unspecific and is suggested to be changed: The biocidal product (the frame formulation) is effective against vegetative bacteria, yeasts and moulds both under clean and soiled conditions. [redacted] Against yeasts and moulds, respectively, [redacted]
Acceptability	Acceptable
Remarks	Throughout the report, the percentage values of concentrations given should specify whether they relate to weight or volume percentages.

Tables for Method

I.1 (mixed) Population / Inoculum (*if necessary; include separate table for different samples*)

Criteria	Details
Nature	Bacteria, Fungi
Origin	[redacted]
Initial biomass	Not known
Reference of methods	EN 1656, EN 1657
Collection / storage of samples	Not known
Preparation of inoculum for exposure	Not known
Pretreatment	Not known
Initial density of test population in the test system	EN 1656 Individual cultures 1.5-5.0 x 10^8 cfu/ml EN 1657 Individual cultures 1.5-5.0 x 10^7 cfu/ml

I.2 Test organism (*if applicable*)

Criteria	Details
Species	For BS EN 1656 [redacted] For BS EN 1657 [redacted]
Strain	[redacted]
Source	[redacted]
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Not Applicable
Mixed age population	No

Criteria	Details
Other specification	None
Number of organisms tested	As in initial density (1.2) above
Method of cultivation	Not reported
Pretreatment of test organisms before exposure	None
Initial density/number of test organisms in the test system	As in initial density (1.2) above

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Test organisms/test substance suspended in fluid media at the temperature (10C) specified in the method. Recovery incubation (no additional humidity) in dry air incubators
Number of vessels / concentration	Not reported
Test culture media and/or carrier material	As described in EN 1656, EN 1657
Nutrient supply	Not applicable, batch culture employed
Measuring equipment	Manual plate reading

1.4 Application of test substance

Criteria	Details
Application procedure	Test substance applied as an aqueous solution
Delivery method	Not reported
Dosage rate	Non variable discreet tests ([redacted]
Carrier	Aqueous
Concentration of liquid carrier	Not known
Liquid carrier control	Not reported
Other procedures	None reported

1.5 Test conditions

Criteria	Details
Substrate	Hard Water as described in EN 1656, EN 1657
Incubation temperature	10°C (±1°C)
Moisture	Not reported
Aeration	Not reported

Criteria	Details
Method of exposure	individual subsamples
Aging of samples	None
Other conditions	Two soil levels employed - "clean" and "dirty" conditions:- Clean conditions – Bovine albumin 3.0g/litre Dirty conditions – Bovine albumin 10.0g/litre + Yeast extract 10.0g/litre

Section A5.3.1_12 Efficacy Data

Official use only

		1 REFERENCE
1.1	**Reference**	EN1276 testing of an all purpose cleaner containing [redacted] Glutaraldehyde), [redacted] 22 September 2000, BPD ID A5.3.1_12, Unpublished, Not GLP.
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF
1.2.2	Companies with letter of access	None
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]
1.3	**Guideline study**	BS EN 1276
1.4	**Deviations**	No
		2 METHOD
2.1	**Test Substance (Biocidal Product)**	Glutaraldehyde ([redacted]). [redacted] aqueous Glutaraldehyde active substance [redacted]
2.1.1	Trade name/ proposed trade name	
2.1.2	Composition of Product tested	The test methodology is designed to determine the efficacy of finished formulations. The test substance was therefore incorporated into such a formulation frame as detailed : [redacted] In an aqueous base pH 6.3
2.1.3	Physical state and nature	Solution
2.1.4	Monitoring of active substance concentration	No
2.1.5	Method of analysis	BS EN 1276 is a Quantitative Suspension Test. 1.9 – 3.7 x 10^8 cfu/ml inoculum of each of the following organisms was employed: [redacted]

		[redacted]
		Contact times were: 5 minutes (compulsory) and 15 minutes. Product (frame formulation) diluent was: Water of standard hardness. Organic load was: Clean conditions – Bovine albumin 0.3g/litre Dirty conditions – Bovine albumin 3.0g/litre The final concentrations of the Frame Formulation (and the active substance Glutaraldehyde) were as follows: [redacted] Criteria for passing the test: at least a 5 $\log_{10}$ reduction
2.2	**Reference substance**	No
2.2.1	Method of analysis for reference substance	Not tested
2.3	**Testing procedure**	
2.3.1	Test population / inoculum / test organism	For BS EN 1276 [redacted]
2.3.2	Test system	BS EN 1276 : Quantitative Suspension Test
2.3.3	Application of TS	The test systems contained the final concentrations of the Frame Formulation (and the active substance Glutaraldehyde) detailed as follows: [redacted]
2.3.4	Test conditions	The test temperature was 20°C (±1°C)
2.3.5	Duration of the test / Exposure time	The exposure times were 5 minutes (compulsory) and 15 minutes.
2.3.6	Number of replicates performed	One

2.3.7	Controls	The formulation was free from contamination prior to testing
2.4	**Examination**	
2.4.1	Effect investigated	Killing
2.4.2	Method for recording / scoring of the effect	Scoring is achieved by subtracting the number of survivors from the initial inoculum. A resulting differential greater than 5 $\log_{10}$ within 5 minutes is required to record a "PASS".
2.4.3	Intervals of examination	5 minutes and 15 minutes
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None

3 RESULTS

3.1 Efficacy

The test does not allow for measured degrees of efficacy and is scored on a "Pass/FAIL" basis, the criteria for which are described as greater than 5 $\log_{10}$ reduction after 5 minutes exposure. The additional exposure time of 15 minutes gives an indication of a measured degree of efficacy. The observed difference between clean and dirty conditions (soil level) may also give an indication of a measured degree of efficacy.

The biocidal product (the frame formulation) PASSED the test (reduced each test organism by at least five $\log_{10}$, where exposed for five minutes under both clean and dirty conditions) when employed in the test system at a dilution [redacted] It was equally effective at this dilution under both clean and dirty conditions.

The biocidal product (the frame formulation) PASSED the test (reduced each test organism by at least five $\log_{10}$, where exposed for five minutes under clean conditions only) when employed in the test system at a dilution [redacted]

3.1.1	Dose/Efficacy curve	Not applicable
3.1.2	Begin and duration of effects	[redacted]
3.1.3	Observed effects in	There was no post monitoring phase

	the post monitoring phase	
3.2	**Effects against organisms or objects to be protected**	No adverse effects were observed
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	A reference substance was not tested
3.5	**Tabular and/or graphical presentation of the summarised results**	[redacted]
3.6	**Efficacy limiting factors**	[redacted]
3.6.1	Occurrences of resistances	There was no evidence or observance of resistance
3.6.2	Other limiting factors	None observed

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1	**Reasons for laboratory testing**	BS EN 1276 is recognised as a standard test for determining the efficacy of biocidal products for use in the household and institutional field. The temperature (20°C), contact time (5 minutes) and soil loadings are all designed to simulate In-Use application.
4.2	**Intended actual**	The testing was carried out using intended use dilutions into test

	scale of biocide application	conditions recognised as acceptable for the field of use (see 4.1 above).
4.3	**Relevance compared to field conditions**	-
4.3.1	Application method	BS EN 1276 is recognised as a standard test for determining the efficacy of biocidal products for use in the household and institutional field . In the field, the biocidal product would be applied in a liquid medium, the target organisms would be resuspended and kill would take place in such a medium.
4.3.2	Test organism	In BS EN 1276 the test organisms have been defined as relevant to the field of use
4.3.3	Observed effect	The observed effect has been achieved under conditions similar to those expected in the field and therefore it is reasonable to assume that the effect is similar to that which would be observed in the field.
4.4	**Relevance for read-across**	Yes The frame formulation is similar to disinfectant formulations used in PT's 2 and 4. The organisms are also relevant to PT 2 and 4.
		5 APPLICANT'S SUMMARY AND CONCLUSION
5.1	**Materials and methods**	The chosen test method, BS EN 1276 is the standard method for determining the efficacy of biocidal products for use in the household and institutional field. The frame formulation used is similar to actual biocidal products used in the field.
5.2	**Reliability**	The BS EN test method was chosen as a peer developed method where reliability was part of the design criteria
5.3	**Assessment of efficacy, data analysis and interpretation**	The results showed that the active substance, glutaraldehyde, could be employed in a basic frame formulation that in turn could then be used at levels similar to those expected in the field. The results showed that the substance was active against organisms relevant to the field under conditions expected in the field.
5.4	**Conclusion**	According to the EN 1276, the biocidal product (the frame formulation) was effective against vegetative bacteria under clean conditions at a concentration [redacted]
5.5	**Proposed efficacy specification**	The biocidal product (the frame formulation) is effective against vegetative bacteria under clean conditions at a [redacted]

Section A5.3.1_12 Efficacy Data

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Key study	EN 1276 Testing of an all purpose cleaner containing 0[redacted], 22 September 2000, BPD ID A5.3.1_12, Unpublished, Not GLP.
Date	January 9, 2009
Comments	
Materials and methods	The biocidal product (frame formulation) was tested for bactericidal activity by a suspension test according to the methods of EN 1276 using membrane filtration method only with minor deviations. The efficacy of the biocide was tested against four vegetative bacteria, two of which were Gram negative, two Gram positive bacteria. The test was conducted at 20°C, both under clean and dirty conditions using two different contact times ([redacted]). The biocidal product (frame formulation) tested contained [redacted] with glutaraldehyde as the active substance at a concentration of [redacted] %. The [redacted] According to the original study report, the experimental conditions were validated. No information was provided about the neutralization procedure applied. In summary, the test was conducted in compliance with the guideline study.
Results and their relevance	The arguments presented for the relevance of results are agreeable. However, as the efficacy assessment was solely based on suspension tests, read-across of results e.g. for surface disinfection applications is to some extent restricted.
Reliability	1
Conclusion	The conclusion presented by the applicant is not relevant enough and should be replaced by the following: According to the EN 1276, the biocidal product (the frame formulation) was effective against vegetative bacteria under clean conditions [redacted]

Section A5.3.1_12 Efficacy Data

Proposed efficacy specification	The specification presented by the applicant is too unspecific and is suggested to be changed:
Point 5.5	The biocidal product (the frame formulation) is effective against vegetative bacteria under clean conditions at a concentration [redacted]
Acceptability	Acceptable
Remarks	Throughout the report, the percentage values of concentrations given should specify whether they relate to weight or volume percentages.

Tables for Method

I.1 (mixed) Population / Inoculum (*if necessary; include separate table for different samples*)

Criteria	Details
Nature	Bacteria
Origin	[redacted]
Initial biomass	Not known
Reference of methods	EN 1276
Collection / storage of samples	Not known
Preparation of inoculum for exposure	Not known
Pretreatment	Not known
Initial density of test population in the test system	Individual cultures 1.9-3.7 x 10^8 cfu/ml

I.2 Test organism (*if applicable*)

Criteria	Details
Species	[redacted]
Strain	[redacted]
Source	[redacted]
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Not Applicable
Mixed age population	No
Other specification	None
Number of organisms tested	As in initial density (1.2) above
Method of cultivation	Not reported
Pretreatment of test organisms before exposure	None
Initial density/number of test organisms in the test system	As in initial density (1.2) above

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Test organisms/test substance suspended in fluid media at the temperature specified in the method. Recovery incubation (no additional humidity) in dry air incubators Recovery using Membrane filtration Technique
Number of vessels / concentration	Not reported
Test culture media and/or carrier material	Tryptone Soy Broth Tryptone Soy Agar 0.1% Peptone diluent
Nutrient supply	Not applicable, batch culture employed
Measuring equipment	Manual plate reading

1.4 Application of test substance

Criteria	Details
Application procedure	Test substance applied as an aqueous solution
Delivery method	Not reported
Dosage rate	Non variable discreet tests [redacted]
Carrier	Aqueous
Concentration of liquid carrier	Not known
Liquid carrier control	Not reported
Other procedures	None reported

1.5 Test conditions

Criteria	Details
Substrate	Water of standard hardness
Incubation temperature	20°C (±1°C)
Moisture	Not reported
Aeration	Not reported
Method of exposure	Individual subsamples
Aging of samples	None
Other conditions	Two soil levels employed - "clean" and "dirty" conditions:- Clean conditions – Bovine albumin 0.3g/litre Dirty conditions – Bovine albumin 3.0g/

Section A5.3.1_13 Efficacy Data

Official use only

1 REFERENCE

1.1	**Reference**	Efficacy of [redacted] against *Mycobacterium* sp. [redacted], BPD ID A5.3.1_13, Study Date 17th August 2002, Unpublished
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF
1.2.2	Companies with letter of access	None
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]
1.3	**Guideline study**	In-house test developed to determine efficacy against mycobacteria. Methodology was based on current EN practice. At the time of testing no EN standard method existed for testing efficacy against [redacted].
1.4	**Deviations**	No

2 METHOD

2.1	**Test Substance (Biocidal Product)**	Glutaraldehyde ([redacted]). [redacted]% aqueous Glutaraldehyde active substance
2.1.1	Trade name/ proposed trade name	[redacted]
2.1.2	Composition of Product tested	[redacted] of glutaraldehyde active substance ([redacted]) in sterile distilled water
2.1.3	Physical state and nature	Solution
2.1.4	Monitoring of active substance concentration	No
2.1.5	Method of analysis	Quantitative Suspension Test. Approximately 1.0×10^7 cfu/ml inoculum of each of the following organisms was employed: [redacted] [redacted] [redacted] Contact times were: [redacted] Organic load was: Clean conditions – No organic load

		Dirty conditions – Bovine albumin 0.3g/litre The final concentrations of the active substance Glutaraldehyde were as follows: [redacted] Criteria for passing the test: at least a 5 log_{10} reduction within [redacted] minutes Recovery employed a glutaraldehyde inactivation step utilising a recovery medium comprising of 30ml/L Polysorbate 80 + 3g/L Lecithin + 10g/L Histidine + 30g/L Tryptone Soy Broth powder (Oxoid).
2.2	**Reference substance**	No
2.2.1	Method of analysis for reference substance	Not tested
2.3	**Testing procedure**	
2.3.1	Test population / inoculum / test organism	[redacted]
2.3.2	Test system	In-house test developed to determine efficacy against mycobacteria. Methodology was based on current EN practice. At the time of testing no EN standard method existed for testing efficacy against mycobacteria
2.3.3	Application of TS	The test systems contained the final concentrations of the active substance Glutaraldehyde detailed as follows: [redacted]
2.3.4	Test conditions	The test temperature was 20°C (±1°C)
2.3.5	Duration of the test / Exposure time	The exposure times were [redacted]
2.3.6	Number of replicates performed	One
2.3.7	Controls	A negative control [0 mg/l (ppm) a.s.] showed that the organisms survived in the test system and that the recovery method was valid
2.4	**Examination**	
2.4.1	Effect investigated	Kill
2.4.2	Method for recording / scoring	Scoring was achieved by subtracting the number of survivors from the initial inoculum. A resulting differential greater than 5 log_{10} within [redacted]

	of the effect	minutes was required to record a "PASS".
2.4.3	Intervals of examination	[redacted]
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None

3 RESULTS

3.1	**Efficacy**	The test did not allow for measured degrees of efficacy and was scored on a "Pass/FAIL" basis, the criteria for which were set as greater than 5 log_{10} reduction after [redacted] minutes exposure [redacted] The observed difference between clean and dirty conditions (soil level) may also give an indication of a measured degree of efficacy. The active substance (the frame formulation) PASSED the test (reduced each test organism by at least five log_{10}, where exposed for [redacted] minutes under clean conditions) against all three isolates tested. This was achieved at both concentrations, [redacted]
3.1.1	Dose/Efficacy curve	Not applicable
3.1.2	Begin and duration of effects	The effects were observed within [redacted] minutes and continued throughout under clean conditions. [redacted]
3.1.3	Observed effects in the post monitoring phase	There was no post monitoring phase
3.2	**Effects against organisms or objects to be protected**	No adverse effects were observed
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	A reference substance was not tested
3.5	**Tabular and/or graphical presentation of the summarised**	[redacted]

	results	[redacted]
3.6	**Efficacy limiting factors**	[redacted]
3.6.1	Occurrences of resistances	There was no evidence or observance of resistance
3.6.2	Other limiting factors	None observed

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1	**Reasons for laboratory testing**	The temperature (20°C), contact time ([redacted] minutes) and soil loadings were chosen as typical and representative of field conditions /
4.2	**Intended actual scale of biocide application**	The testing was carried out using intended use dilutions into test conditions recognised as acceptable for the field of use (see 4.1 above).

4.3	**Relevance compared to field conditions**	-
4.3.1	Application method	In the field, the biocidal product would be applied in a liquid medium, the target organisms would be resuspended and kill would take place in such a medium.
4.3.2	Test organism	The test organisms were relevant to the field of use, one being a clinical isolate.
4.3.3	Observed effect	The observed effect has been achieved under conditions similar to those expected in the field and therefore it is reasonable to assume that the effect is similar to that which would be observed in the field.
4.4	**Relevance for read-across**	No, as mycobacteria are predominantly relevant to PT2 applications.

5 APPLICANT'S SUMMARY AND CONCLUSION

5.1	**Materials and methods**	The test method was developed especially to determine the performance of glutaraldehyde against several mycobacteria. The concentrations tested were similar to actual biocidal products used in the field.
5.2	**Reliability**	[redacted]
5.3	**Assessment of efficacy, data analysis and interpretation**	The results showed that the active substance, glutaraldehyde, could be employed in a basic frame formulation that in turn could then be used at levels similar to those expected in the field. The results showed that the substance was active against organisms relevant to the field under conditions expected in the field.
5.4	**Conclusion**	Under clean and lightly soiled conditions glutaraldehyde was demonstrated to be efficient against mycobacteria. [redacted]
5.5	**Proposed efficacy specification**	See text above.

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Key study	Efficacy of [redacted] against *Mycobacterium* sp. [redacted], BPD ID A5.3.1_13, Study Date 17th August 2002, Unpublished
Date	January 12, 2009
Materials and methods	The biocidal product ([redacted]) was tested for mycobactericidal activity by a suspension test using an in-house method based on current EN practice. The efficacy of the biocide was tested against three mycobacterial strains. The biocide was tested at two concentration levels of glutaraldehyde [redacted]. One notable deviation from the EN practice was that amount of organic soil under dirty testing conditions was essentially lower than in corresponding EN suspension tests (0.3 g/l vs 3.0 g /l). According to the original study report, the inactivation procedure applied after the treatment was appropriately validated although the validation results were not reported in detail.
Point 5.1	In the applicant's summary, under materials and methods the target organisms, concentrations tested and the method applied should be briefly described.
Results and their relevance	Under test conditions without any organic load interfering (clean conditions) glutaraldehyde was efficient against all three mycobacterial strains at a [redacted]. Under test conditions interfered with light organic load (0.3 g/l of bovine albumin [redacted]
Point 4.4	As the efficacy assessment was solely based on suspension tests, read-across of results e.g. for surface disinfection applications is restricted.
Reliability	2
Conclusion	In all EN methods, organic load (bovine albumin) rate of 0.3 g/l is used to simulate clean, not high soil loading conditions as stated in applicant's conclusion. The conclusion is suggested to be modified as follows: Under clean and lightly soiled conditions glutaraldehyde was demonstrated to be efficient against mycobacteria. [redacted]
Remarks	Throughout the report, the percentage values of concentrations given should specify whether they relate to weight or volume percentages.

Tables for Method

I.1 (mixed) Population / Inoculum (*if necessary; include separate table for different samples*)

Criteria	Details
Nature	Bacteria
Origin	[redacted]
Initial biomass	Not known
Reference of methods	In house quantitative suspension test
Collection / storage of samples	Not known
Preparation of inoculum for exposure	Not known
Pretreatment	Not known
[redacted]	[redacted]

I.2 Test organism (*if applicable*)

Criteria	Details
Species	[redacted]
Strain	[redacted]
Source	[redacted]
Laboratory culture	YES
Stage of life cycle and stage of stadia	Not Applicable
Mixed age population	No
Other specification	None
Number of organisms tested	As in initial density (1.2) above
Method of cultivation	Not reported
Pretreatment of test organisms before exposure	None
Initial density/number of test organisms in the test system	As in initial density (1.2) above

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Test organisms/test substance suspended in fluid media at the temperature specified in the method. Recovery incubation (no additional humidity) in dry air incubators
Number of vessels / concentration	Not reported
Test culture media and/or carrier material	Middlebrook Agar 0.1% Peptone diluent
Nutrient supply	Not applicable, batch culture employed
Measuring equipment	Manual plate reading

1.4 Application of test substance

Criteria	Details
Application procedure	Test substance applied as an aqueous solution
Delivery method	Not reported
Dosage rate	[redacted] active substance Glutaraldehyde)
Carrier	Aqueous
Concentration of liquid carrier	Not known
Liquid carrier control	Not reported
Other procedures	None reported

1.5 Test conditions

Criteria	Details
Substrate	Sterile Distilled Water
Incubation temperature	25°C (±1°C)
Moisture	Not reported
Aeration	Not reported
Method of exposure	individual subsamples
Aging of samples	None
Other conditions	Two soil levels employed - "clean" and "dirty" conditions:- Clean conditions – Bovine albumin 0.g/litre Dirty conditions – Bovine albumin 0.3g/litre

Section A5.3.1_14 Efficacy Data

Official use only

		1 REFERENCE
1.1	**Reference**	Efficacy of [redacted] against *Legionella pneumophila*, [redacted], BPD ID A5.3.1_14, 10th June 2007, Unpublished, Not GLP
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF
1.2.2	Companies with letter of access	None
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]
1.3	**Guideline study**	In-house test developed to determine efficacy against *Legionella pneumophila*. Methodology was based on current EN practice and a specific Legionella method still in draft. At the time of testing no EN standard method existed for testing efficacy against *L. pneumophila*. At least a 5 $\log_{10}$ reduction within [redacted] hours was considered a requirement for recording a "PASS" in the test.
1.4	**Deviations**	No
		2 METHOD
2.1	**Test Substance (Biocidal Product)**	Glutaraldehyde ([redacted]). [redacted]% aqueous Glutaraldehyde active substance
2.1.1	Trade name/ proposed trade name	[redacted]
2.1.2	Composition of Product tested	[redacted] solutions of glutaraldehyde active substance ([redacted]) in sterile distilled water
2.1.3	Physical state and nature	Solution
2.1.4	Monitoring of active substance concentration	No
2.1.5	Method of analysis	Quantitative Suspension Test. Approximately 5.0 x 10^8 cfu/ml inoculum of *Legionella pneumophila* [redacted] was employed. Contact times were [redacted] Organic load was: Clean conditions – No organic load

		The final concentrations of the active substance Glutaraldehyde were as follows: [redacted] [redacted] Criteria for passing the test: at least a 5 log_{10} reduction within [redacted] hours Recovery employed a glutaraldehyde inactivation step utilising a recovery medium comprising of 30 ml/L Polysorbate 80 + 3g/L Lecithin + 10 g/L Histidine + 30 g/L Tryptone Soy Broth powder (Oxoid).
2.2	**Reference substance**	No
2.2.1	Method of analysis for reference substance	Not tested
2.3	**Testing procedure**	
2.3.1	Test population / inoculum / test organism	*Legionella pneumophila* [redacted]
2.3.2	Test system	In-house test developed to determine efficacy against *Legionella pneumophila*. Methodology was based on current EN practice. At the time of testing no EN standard method existed for testing efficacy against *Legionella* spp.. At least a 5 log_{10} reduction within [redacted] hours was considered a requirement for recording a "PASS" in the test.
2.3.3	Application of TS	The test systems contained the final concentrations of the active substance Glutaraldehyde detailed as follows: [redacted]
2.3.4	Test conditions	The test temperature was 20°C (±1°C)
2.3.5	Duration of the test / Exposure time	The exposure times were [redacted]
2.3.6	Number of replicates performed	One
2.3.7	Controls	A negative control [0 mg/l (ppm) a.s.] showed that the organisms survived in the test system and that the recovery method was valid
2.4	**Examination**	
2.4.1	Effect investigated	Kill
2.4.2	Method for recording / scoring of the effect	Scoring was achieved by subtracting the number of survivors from the initial inoculum. A resulting differential greater than 5 log_{10} within [redacted] hours was required to record a "PASS".

2.4.3	Intervals of examination	[redacted]
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None
		3 RESULTS
3.1	**Efficacy**	The standard test did not allow for measured degrees of efficacy and was scored on a "Pass/FAIL" basis, the criteria for which were set as greater than 5 $\log_{10}$ reduction after [redacted] hours exposure. [redacted] The active substance PASSED the test (reduced the test organism by at least 5 $\log_{10}$, where exposed for [redacted] hours under clean conditions) against the test organism. [redacted] [redacted]
3.1.1	Dose/Efficacy curve	Not applicable
3.1.2	Begin and duration of effects	For the [redacted] This effect continued throughout under clean conditions. For the [redacted]
3.1.3	Observed effects in the post monitoring phase	There was no post monitoring phase
3.2	**Effects against organisms or objects to be protected**	No adverse effects were observed
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	A reference substance was not tested

3.5	**Tabular and/or graphical presentation of the summarised results**	[redacted]
3.6	**Efficacy limiting factors**	There were no limiting factors observed during the test. Exposure time was relevant but both cases exposure time was sufficient to allow a "PASS" to be recorded. Concentration was also relevant [redacted]
3.6.1	Occurrences of resistances	There was no evidence or observance of resistance
3.6.2	Other limiting factors	None observed

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1	**Reasons for laboratory testing**	The temperature (20°C) and contact time ([redacted] hours) were chosen as typical and representative of field conditions /
4.2	**Intended actual scale of biocide application**	The testing was carried out using intended use dilutions into test conditions recognised as acceptable for the field of use (see 4.1 above).
4.3	**Relevance compared to field conditions**	-
4.3.1	Application method	In the field, the biocidal product would be applied in a liquid medium, the target organisms would be resuspended and kill would take place in such a medium.
4.3.2	Test organism	The test organisms were relevant to the field of use, *Legionella pneumophila* is the clinically significant species of the genus *Legionella*

4.3.3	Observed effect	The observed effect has been achieved under conditions similar to those expected in the field and therefore it is reasonable to assume that the effect is similar to that which would be observed in the field.	
4.4	**Relevance for read-across**	Yes, this work is relevant to PT11 applications. As well as to PT2 applications.	x
		5 APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The test method was developed especially to determine the performance of glutaraldehyde against *Legionella pneumophila*. The concentrations tested were similar to actual biocidal products used in the field.	x
5.2	**Reliability**	[redacted]	
5.3	**Assessment of efficacy, data analysis and interpretation**	The results showed that the active substance, glutaraldehyde, was efficient at a concentration [redacted]. The results showed that the substance was active against target bacteria relevant to the field under clean conditions.	
5.4	**Conclusion**	Under test conditions without any organic load interfering (clean conditions), glutaraldehyde was efficient against *Legionella pneumophila* at a concentration of [redacted]	x
5.5	**Proposed efficacy specification**	Without any organic load interfering (clean conditions), glutaraldehyde is efficient against *Legionella pneumophila* when used at a concentration of [redacted]	

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Key study	Efficacy of [redacted] against *Legionella pneumophila*, [redacted], BPD ID A5.3.1_14, 10th June 2007, Unpublished, Not GLP
Date	January 13, 2009
Comments	
Materials and methods	The biocidal product ([redacted]) was tested for bactericidal activity against *Legionella pneumophila* by a suspension test using an in-house method based on current EN practice. The efficacy of the biocide was tested against one *Legionella* strain originating from [redacted] (according to EN, testing should be conducted at three levels) concentration levels of glutaraldehyde ([redacted]l) only under clean conditions using five different contact times ([redacted]). Deviating from the EN methods (EN: 0.3 g/l of albumin), no organic load was added into the test system simulating clean conditions. According to the original study report, the inactivation procedure applied after the treatment was appropriately validated although the validation results were not reported in detail.
Point 5.1	In the applicant's summary, under materials and methods the target organisms, concentrations tested and the method applied should be briefly described.
Results and their relevance	
Point 4.4	The results are relevant under clean conditions. As the efficacy assessment was solely based on suspension tests, read-across of results e.g. for surface disinfection applications is restricted.
Reliability	[redacted]
Conclusion	Under test conditions without any organic load interfering (clean conditions), glutaraldehyde was efficient against *Legionella pneumophila* at a concentration of [redacted]
Point 5.4	
Acceptability	Acceptable
Remarks	none

Tables for Method

1.1 (mixed) Population / Inoculum (*if necessary; include separate table for different samples*)

Criteria	Details
Nature	Bacteria
Origin	[redacted]
Initial biomass	Not known
Reference of methods	In- house quantitative suspension test
Collection / storage of samples	Not known
Preparation of inoculum for exposure	Not known
Pretreatment	Not known
Initial density of test population in the test system	Approximately 5.0 x 10^8 cfu/ml

1.2 Test organism (*if applicable*)

Criteria	Details
Species	*Legionella pneumophila*
Strain	[redacted]
Source	[redacted]
Laboratory culture	YES
Stage of life cycle and stage of stadia	Not Applicable
Mixed age population	No
Other specification	None
Number of organisms tested	As in initial density (1.2) above
Method of cultivation	Not reported
Pretreatment of test organisms before exposure	None
Initial density/number of test organisms in the test system	As in initial density (1.2) above

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Test organisms/test substance suspended in fluid media at the temperature specified in the method. Recovery incubation (no additional humidity) in dry air incubators
Number of vessels / concentration	Not reported
Test culture media and/or carrier material	Culture Medium: BCYE Agar Carrier: 0.1% Peptone diluent
Nutrient supply	Not applicable, batch culture employed
Measuring equipment	Manual plate reading

1.4 Application of test substance

Criteria	Details
Application procedure	Test substance applied as an aqueous solution
Delivery method	Not reported
Dosage rate	Non variable discreet tests [redacted] active substance Glutaraldehyde)
Carrier	Aqueous
Concentration of liquid carrier	Not known
Liquid carrier control	Not reported
Other procedures	None reported

1.5 Test conditions

Criteria	Details
Substrate	Sterile Distilled Water
Incubation temperature	37°C (±1°C)
Moisture	Not reported
Aeration	Not reported
Method of exposure	individual subsamples
Aging of samples	None
Other conditions	Clean conditions - no added soilent

Section A5.3.1_17 **Efficacy Data**
Preservation of Drilling Mud's and Work over Fluids

			Official use only
		1 REFERENCE	
1.1	**Reference**	The efficacy of [redacted] in the preservation of drilling mud's and work over fluids and Addendum, [redacted], BPD ID A5.3.1_17, Unpublished, Non GLP	
1.2	**Data protection**	Yes	
1.2.1	Data owner	BASF [redacted]	
1.2.2	Companies with letter of access	None	
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]	
1.3	**Guideline study**	Internal protocol based upon American Petroleum Institute RP 88; " Biological analysis of subsurface injection waters; Section II Evaluation of Chemicals for control of microbial growth"	
1.4	**Deviations**	Yes – method given in report, deviations from standard method not reported.	
		2 METHOD	
2.1	**Test Substance (Biocidal Product)**	[redacted]% Glutaraldehyde)	
2.1.1	Trade name/ proposed trade name	[redacted]	
2.1.2	Composition of Product tested	[redacted]% Glutaraldehyde. The product was tested at three concentration levels containing [redacted]) of a.i..	
2.1.3	Physical state and nature	Liquid	
2.1.4	Monitoring of active substance concentration	No	
2.1.5	Method of analysis	N/A	
2.2	**Reference substance**	No	
2.2.1	Method of analysis for reference substance	N/A	
2.3	**Testing procedure**		
2.3.1	Test population / inoculum / test organism	**Aerobic bacteria** [redacted] [redacted]	

Anaerobic bacteria

[redacted]

Fungi (Yeast)

[redacted]

Fungi (Mould)

[redacted]

Key:

[redacted]

2.3.2	Test system	see Table 1.3
2.3.3	Application of TS	Preservative system dosed once at the final stage of the production process. Biocide dosed via simple mixing into the product to be preserved. Challenge test conducted immediately after dosing. see Table 1.4
2.3.4	Test conditions	see Table 1.5
2.3.5	Duration of the test / Exposure time	The samples were inoculated and checked for test organism survival after [redacted] using a Total Viable Count (TVC) technique
2.3.6	Number of replicates performed	One
2.3.7	Controls	In each case an unpreserved inoculated control was run (-ve control, expected to fail test)

2.4 Examination

Section A5.3.1_17 | **Efficacy Data**
Preservation of Drilling Mud's and Work over Fluids

2.4.1	Effect investigated	Adequacy of preservation. Level of active ingredient required for effective preservation (dose response).
2.4.2	Method for recording / scoring of the effect	Monitoring levels of microbial contamination in product via Total Viable Counts (TVC's) following deliberate contamination of the product.
2.4.3	Intervals of examination	The samples were inoculated and checked for test organism survival [redacted] anaerobic organisms
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None
		3 RESULTS
3.1	**Efficacy**	[redacted] at all test concentrations reduced anaerobic sulphate reducing bacteria (a major source of oil souring and corrosion) to undetectable levels [redacted]. In all test systems, [redacted] was shown to reduce the bacterial and fungal challenge to below detectable levels [redacted]
3.1.1	Dose/Efficacy curve	A clear dose efficacy relationship was established – [redacted]
3.1.2	Begin and duration of effects	Already after [redacted]
3.1.3	Observed effects in the post monitoring phase	N/A
3.2	**Effects against organisms or objects to be protected**	No observed adverse effects
3.3	**Other effects**	None observed
3.4	**Efficacy of the reference substance**	N/A
3.5	**Tabular and/or graphical presentation of the summarised**	Aerobic bacteria, graphical results for the 4 products tested

	results	Aerobic bacteria, graphical results for the 4 products tested
		Aerobic fungi, graphical results for the 4 products tested
		Anaerobic bacteria, graphical results for the 4 products tested
3.6	**Efficacy limiting factors**	-
3.6.1	Occurrences of resistances	None
3.6.2	Other limiting factors	None
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS
4.1	**Reasons for laboratory testing**	Dosing contaminated fluids into an oil well would not be sound practice – also sampling thereafter would be daunting!
4.2	**Intended actual scale of biocide application**	Laboratory test was performed on representative drilling mud's and fluids.
4.3	**Relevance compared to field conditions**	-
4.3.1	Application method	The application method in the laboratory test is comparable with the planned field application method (simple mixing)
4.3.2	Test organism	The test organisms were representative of those that might be found as contaminants during the intended use(s)
4.3.3	Observed effect	The observed effect in the laboratory test is comparable to the desired effect(s) in field applications.
4.4	**Relevance for read-across**	Yes Other PT 6 industrial preservation applications have similar demands for microbial control of likely contaminants.

5 APPLICANT'S SUMMARY AND CONCLUSION

5.1 Materials and methods

Data was generated to demonstrate the preservative efficacy of [redacted] at varying concentrations in drilling mud's and work over fluids via a challenge test procedure. Mixed inoculums of aerobic bacteria, aerobic fungi and anaerobic bacteria were added to each of the test vehicles and monitored over time ([redacted]) for viable counts. The reduction in colony forming units in treated samples was compared against an untreated control and conclusions drawn.

5.2 Reliability

[redacted]

5.3 Assessment of efficacy, data analysis and interpretation

[redacted] is a well known fast acting biocide with well characterised performance against a range of microorganisms. The expected dose response was seen against aerobic microorganisms, whilst [redacted] was effective against the mixed anaerobic bacterial challenge.

[redacted] tested reduced anaerobic sulphate reducing bacteria (a major source of oil souring and corrosion) to undetectable levels within [redacted] hour.

In all test systems, [redacted] was shown to reduce the bacterial challenge to below detectable levels within [redacted]. [redacted]

5.4 Conclusion

The results demonstrate that [redacted] can effectively protect drilling mud's and work over fluids when used at concentrations of [redacted]

5.5 Proposed efficacy specification

All samples were effectively preserved by using [redacted]

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Key study	The efficacy of [redacted] in the preservation of drilling mud's and work over fluids and Addendum, [redacted], BPD ID A5.3.1_17, Unpublished, Non GLP
Date	January 14, 2009
Comments	
Materials and methods	The efficacy of [redacted] as a preservative protecting drilling muds and fluids from microbial spoilage was tested. An internal protocol based on a method of American Petroleum Institute was applied. The biocide containing [redacted]% of active substance was added at three concentration levels ([redacted]) to four types of drilling mud and fluid samples. From the control sample, the biocide was omitted. All samples were thereafter contaminated with a mixed inoculum of aerobic and anaerobic bacteria, and aerobic fungi. The microbial mixture consisted of seven bacterial strains (one Gram negative and one Gram positive, spore-forming strain plus five anaerobic, sulphate reducing strains, two yeast strains and one mould strain. All the strains originated from [redacted], and the maintenance of stock cultures and preparation of working cultures were adequately described. The survival of the contaminants in the samples was followed using validated recovery media after [redacted] The tests were conducted, although reportedly not in compliance with GLP, in accordance with generally accepted scientific principles

Evaluation by Competent Authorities	
Results and their relevance	
Point 4.4	The formulation to be preserved, its contamination level and types of contaminants prevailing strongly affect the efficacy of all preservatives. Direct read-across of results is therefore not possible between any PT 6 products. Applicant input 7 May 2009: *BASF considers that this study tested four different drilling muds and work over fluids and found that concentrations of* [redacted] *of product are effective. Our experience in marketing and technically supporting this product into PT6 applications over many years leads us to believe that similar amounts would be needed across the diversity of PT6 preservation applications. In other PT 6 applications, such as mineral slurries,* [redacted] *is mostly used in combination with other biocides to provide effective preservation. Therefore we propose that for PT 6 that glutaraldehyde (ai) should be dosed between* [redacted] *in products to be preserved.* [redacted] *(product) should be added to the consumer or industrial product to give a typical final concentration of* [redacted]*. The dose rates stated above replace those recommended in documents IIIA [original recommendation between* [redacted] *in document IIIA] and IIIB of the dossier [original recommendations consumer / detergent use:* [redacted] *and Industrial use such as oilfield or slurry products* [redacted] RMS response 15 July 2009: *In general suggestion agreed. Due to the diversity of potential PT6 preservation applications, dosage rate recommendations should be specified separately for PT6 products differing from drilling muds and work over fluids. In all different matrices/applications, the results of this study may not be universally read across.*
Reliability Point 5.2	[redacted]
Conclusion Point 5.4	The results demonstrate that [redacted] can effectively protect drilling muds and work over fluids from spoilage when used at concentrations of [redacted]
Acceptability	Acceptable
Remarks	-

Tables for Method

I.1 (mixed) Population / Inoculum (if necessary; include separate table for different samples)

Criteria	Details
Nature	Freeze dried cultures
Origin	[redacted]
Initial biomass	N/A
Reference of methods	European norm method EN 12353 Storage of Test Strains
Collection / storage of samples	Received in post on request.
Preparation of inoculum for exposure	2nd passage cultures were used to prepare the inoculum
Pretreatment	The challenge organisms were subcultured under suitable conditions: Aerobic bacteria – cultured on TSA, at 30°C±2°C for at least 3 d. Anaerobic bacteria – cultured in NCIMB Postgates Medium for Marine Sulphate Reducers and incubated anaerobically at 30°C±2°C for at least 7 d. Fungi - cultured on SAB, at 25°C±2°C for at least 5 d.
Initial density of test population in the test system	Each test system was dosed separately with 1-ml of a mixed inoculum (aerobic bacterial / aerobic fungal / anaerobic sulphate reducing bacteria) to achieve an in test microbial concentration of approximately 5.0 x 10^5 cfu/ml.

I.2 Test organism (if applicable)

Criteria	Details
Species	**Aerobic bacteria**
Strain	[redacted] [redacted] **Anaerobic bacteria** [redacted] [redacted] [redacted] [redacted] [redacted] **Fungi**

	[redacted]
Source	[redacted]
Laboratory culture	Yes
Stage of life cycle and stage of stadia	N/A
Mixed age population	N/A
Other specification	Approximately equal quantities of each culture used
Number of organisms tested	Approximately 5.0×10^5 cfu/ml
Method of cultivation	The challenge organisms were sub cultured under suitable conditions:
Pretreatment of test organisms before exposure	Aerobic bacteria – cultured on TSA, at 30°C±2°C for at least 3 d. Anaerobic bacteria – cultured in NCIMB Postgates Medium for Marine Sulphate Reducers and incubated anaerobically at 30°C±2°C for at least 7 d. Fungi - cultured on SAB, at 25°C±2°C for at least 5 d. 2^{nd} passage cultures were used to prepare the inoculum.
Initial density/number of test organisms in the test system	1ml of mixed culture added to 50ml of test vehicle. Inoculum counts were: Aerobic bacteria 8.0×10^7 Fungi 6.4×10^6 Anaerobic bacteria 1.1×10^6

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Test chamber containing 50ml of product
Number of vessels / concentration	1 chamber per biocide concentration for each of the mixed cultures (aerobic bacteria, anaerobic bacteria, Fungi)
Test culture media and/or carrier material	Petri dishes (90 ml triple vented) containing approximately 19ml agar (Tryptone Soya Agar / Iron Sulphate Agar / Sabauraud Dextrose Agar) Recovery diluent Letheen Broth or aerobic tests and ¼ Ringers diluent in NCIMB Postgate's Medium for Marine Sulphate Reducers for the anaerobes.
Nutrient supply	Media
Measuring equipment	Simple plate count. cfu's per dilution plate is calculated into surviving cfu's of test system

1.4 Application of test substance

Criteria	Details
Application procedure	Preservative system dosed once at the final stage of the production process. Challenge test conducted once samples were prepared.
Delivery method	Hand mixing
Dosage rate	[redacted]
Carrier	N/A
Concentration of liquid carrier	N/A
Liquid carrier control	N/A
Other procedures	N/A

I.5 Test conditions

Criteria	Details
Substrate	[redacted]
	[redacted]
	Key : ppg = pounds per gallon ppb = pounds per barrel

	[redacted]
Incubation temperature	30°C±2°C
Moisture	Not measured
Aeration	N/A
Method of exposure	Inoculum added with stirring
Aging of samples	Fresh samples, not aged.
Other conditions	All anaerobic work was conducted in a suitable anaerobic cabinet.

Section A5.3.1_20 Efficacy Data

			Official use only
		1 REFERENCE	
1.1	**Reference**	Efficacy Testing of [redacted] against Bacterial spores, [redacted], BPD ID A5.3.1_20, 05 June 2007, Unpublished, Not GLP	
1.2	**Data protection**	Yes	
1.2.1	Data owner	BASF	
1.2.2	Companies with letter of access	None	
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]	
1.3	**Guideline study**	In-house test developed to determine efficacy against bacterial spores. Methodology was based on a pr EN216003 draft. At the time of testing no published EN standard method existed for testing efficacy against bacterial spores. At least a 4 $\log_{10}$ reduction within [redacted] minutes was considered a requirement for recording a "PASS" in the test.	x
1.4	**Deviations**	No	
		2 METHOD	
2.1	**Test Substance (Biocidal Product)**	[redacted]Glutaraldehyde) [redacted]% aqueous Glutaraldehyde active substance	
2.1.1	Trade name/ proposed trade name	[redacted]	
2.1.2	Composition of Product tested	[redacted] solutions of glutaraldehyde active substance (0[redacted]) in sterile distilled water	
2.1.3	Physical state and nature	Solution	
2.1.4	Monitoring of active substance concentration	No	
2.1.5	Method of analysis	Quantitative Suspension Test. Approximately 5 x 10^6 cfu/ml inoculum of bacterial spores was employed from each of two species [redacted]. The spores were aged for 12 weeks prior to use in the test. Contact times were: [redacted]	

		Clean conditions – No organic load The final concentrations of the active substance Glutaraldehyde were as follows: [redacted] Criteria for passing the test: at least a 4 log_{10} reduction within [redacted] For the standard test pH was maintained between pH 6 and pH 7. Additionally a further test was run to examine the effect of pH. For this test the pH was maintained at between pH 8 and pH 9. Recovery employed a glutaraldehyde inactivation step utilising a recovery medium comprising of 30ml/L Polysorbate 80 + 3g/L Lecithin + 10g/L Histidine + 30g/L Tryptone Soy Broth powder (Oxoid).
2.2	**Reference substance**	No
2.2.1	Method of analysis for reference substance	Not tested
2.3	**Testing procedure**	
2.3.1	Test population / inoculum / test organism	[redacted]
2.3.2	Test system	In-house test developed to determine efficacy against bacterial spores. Methodology was based on a pr EN216003 draft. At the time of testing no published EN standard method existed for testing efficacy against bacterial spores. At least a 4 log_{10} reduction within [redacted] was considered a requirement for recording a "PASS" in the test.
2.3.3	Application of TS	The test systems contained the final concentrations of the active substance Glutaraldehyde detailed as follows: [redacted] The test was repeated at an additional, raised. pH. All other parameters remained as in the original.
2.3.4	Test conditions	The test temperature was 20°C (±1°C)
2.3.5	Duration of the test / Exposure time	[redacted]
2.3.6	Number of replicates performed	One
2.3.7	Controls	A negative control [0 mg/l (ppm) a.s.] showed that the organisms

		survived in the test system and that the recovery method was valid
2.4	**Examination**	
2.4.1	Effect investigated	Kill
2.4.2	Method for recording / scoring of the effect	Scoring was achieved by subtracting the number of survivors from the initial inoculum. A resulting differential greater than 4 $\log_{10}$ within [redacted] was required to record a "PASS".
2.4.3	Intervals of examination	[redacted]
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None

3 RESULTS

3.1 Efficacy

The standard test did not allow for measured degrees of efficacy and was scored on a "Pass/FAIL" basis, the criteria for which were set as greater than 5 $\log_{10}$ reduction after [redacted] exposure.

The additional exposure times gave an indication of a measured degree of efficacy.

The additional test at raised pH gave an indication of how the degree of efficacy was affected by pH.

The active substance PASSED the test (reduced the spore inoculum by at least 4 $\log_{10}$, where exposed for [redacted] under clean conditions) against the test organism.

Under standard conditions (pH 6-7) this was achieved against the spores of both organisms, at [redacted]

Under the additional condition of raised pH (pH 8-9), a 4 $\log_{10}$ reduction was achieved [redacted]

Under the additional condition of raised pH (pH 8-9), a 4 $\log_{10}$ reduction was achieved [redacted]

Increasing pH to >8<9 increases the efficacy of the active substance allowing the use [redacted]

3.1.1	Dose/Efficacy curve	Not applicable

3.1.2	Begin and duration of effects	For the standard test at pH 6-7, [redacted] For the raised pH test at pH >8<9, [redacted]
3.1.3	Observed effects in the post monitoring phase	There was no post monitoring phase
3.2	**Effects against organisms or objects to be protected**	No adverse effects were observed
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	A reference substance was not tested

3.5 Tabular and/or graphical presentation of the summarised results

[redacted]

3.6	**Efficacy limiting factors**	There were no limiting factors observed during the test. [redacted]
3.6.1	Occurrences of resistances	There was no evidence or observance of resistance
3.6.2	Other limiting factors	None observed

4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS

4.1	**Reasons for laboratory testing**	The temperature (20°C), use concentrations, contact time ([redacted]) and pH (6-7) were chosen as typical and representative of field conditions. Under certain field conditions, raised pH formulations are common practice. This was also examined within the test.
4.2	**Intended actual scale of biocide application**	The testing was carried out using intended use dilutions into test conditions recognised as acceptable for the field of use (see 4.1 above).
4.3	**Relevance compared to field conditions**	
4.3.1	Application method	In the field, the biocidal product would be applied in a liquid medium, the target organisms would be resuspended and kill would take place in such a medium.
4.3.2	Test organism	The test organisms were relevant to the field of use.
4.3.3	Observed effect	The observed effect has been achieved under conditions similar to those expected in the field and therefore it is reasonable to assume that the effect is similar to that which would be observed in the field.
4.4	**Relevance for read-across**	No, sporicidal activity is only relevant to the medical field.

5 APPLICANT'S SUMMARY AND CONCLUSION

5.1	**Materials and methods**	The test method was developed especially to determine the performance of glutaraldehyde against bacterial spores. The concentrations tested were similar to actual biocidal products used in the field.
5.2	**Reliability**	[redacted]

5.3	**Assessment of efficacy, data analysis and interpretation**	The results showed that glutaraldehyde was active against [redacted] relevant to the field under conditions expected in the field. [redacted]
5.4	**Conclusion**	Glutaraldehyde is effective against [redacted]
5.5	**Proposed efficacy specification**	Glutaraldehyde is effective against [redacted]

Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Key study	Efficacy Testing of [redacted] against Bacterial spores, [redacted], BPD ID A5.3.1_20, 05 June 2007, Unpublished, Not GLP
Date	January 15, 2009
Comments	
Materials and methods Point 1.3	The sporicidal activity of the biocide ([redacted]) containing [redacted]% of glutaraldehyde as the active substance was tested by a suspension test. The method applied was based on a preliminary EN standard pr EN216003 corresponding with some deviations the current EN 14347. The major difference between these methods is related to the passing criteria: a 4 $\log_{10}$ reduction in [redacted] is required by the prEN 216003, whereas acc. to EN 14347 similar reduction should be achieved in 120 min. In accordance with the guideline study, [redacted] were used as the target organisms. The maintenance of stock cultures and preparation of working cultures were adequately described. The efficacy of the active substance was tested at three concentration levels ([redacted]) and two pH levels (pH 6-7 and pH 8-9) using three different contact times ([redacted]). The test was conducted under clean conditions only. The inactivation procedure used in recovering the surviving spores, though not reported in detail, was validated adequately. According to the study summary, the test was not conducted under GLP. However, on the basis of the original study report generally accepted scientific principles were followed in the testing procedure. In the applicant's summary, under materials and methods the target organisms, concentrations tested and the method applied should be briefly described.
Results and their relevance	Under standard conditions (pH 6-7) the active substance at a concentration [redacted] The results obtained are relevant in liquid based applications not challenged by organic load.
Reliability	[redacted]
Conclusion	Glutaraldehyde is effective [redacted]
Acceptability	Acceptable
Remarks	Throughout the report, the percentage values of concentrations given should specify whether they relate to weight or volume percentages.

Tables for Method

1.1 (mixed) Population / Inoculum (*if necessary; include separate table for different samples*)

Criteria	Details
Nature	Bacterial spores
Origin	[redacted]
Initial biomass	Not known
Reference of methods	In- house quantitative suspension test
Collection / storage of samples	Not known
Preparation of inoculum for exposure	Not known
Pretreatment	Not known
Initial density of test population in the test system	Approximately 5.0×10^6 cfu/ml

1.2 Test organism (*if applicable*)

Criteria	Details
Species	[redacted]
Strain	[redacted]
Source	[redacted]
Laboratory culture	Yes
Stage of life cycle and stage of stadia	Freshly germinated spores, previously stored in spore state for 12 weeks
Mixed age population	No
Other specification	None
Number of organisms tested	As in initial density (1.2) above
Method of cultivation	Spores harvested from Manganese sulphate agar after eight weeks storage/incubation Spores were then recovered into 65% isopropanol and left in contact for 3 hrs. After further washing the spores were stored in sterile distilled water at 4C for a further four weeks
Pretreatment of test organisms before exposure	See "cultivation" above
Initial density/number of test organisms in the test system	As in initial density (1.2) above

1.3 Test system

Criteria	Details
Culturing apparatus / test chamber	Test organisms/test substance suspended in fluid media at the temperature specified in the method. Recovery incubation was at 37C for at least 7 days(no additional humidity) in dry air incubators
Number of vessels / concentration	Not reported
Test culture media and/or carrier material	Culture Medium: Tryptone Soy Agar
Nutrient supply	Not applicable, batch culture employed
Measuring equipment	Manual plate reading

1.4 Application of test substance

Criteria	Details
Application procedure	Test substance applied as an aqueous solution
Delivery method	Not reported
Dosage rate	Non variable discreet tests ([redacted] active substance Glutaraldehyde)
Carrier	Aqueous
Concentration of liquid carrier	Not known
Liquid carrier control	Not reported
Other procedures	None reported

1.5 Test conditions

Criteria	Details
Substrate	Sterile Distilled Water
Incubation temperature	37°C (±1°C)
Moisture	Not reported
Aeration	Not reported
Method of exposure	individual subsamples
Aging of samples	None
Other conditions	Clean conditions - no added soilent

Section B5.10 **Efficacy Data**
Annex Point IIB5.10
TNsG: Pt. I-B5.10, Pt. III-Ch. 6

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		1 REFERENCE
1.1	**Reference**	EN1275 & EN1650 Efficacy Testing of [redacted]% Glutaraldehyde), [redacted], BPD ID A5.3.1_21, 21st June 2007, Unpublished, Not GLP
1.2	**Data protection**	Yes
1.2.1	Data owner	BASF
1.2.2	Companies with letter of access	None
1.2.3	Criteria for data protection	Data on new [a.s. / b.p.] for [first entry to Annex I/IA / authorisation]
1.3	**Guideline study**	BS EN 1275 - Basic Fungicidal Activity BS EN 1650 – Fungicidal Activity, Biocidal products for the Industrial and Institutional Disinfection Market
1.4	**Deviations**	Tested against [redacted]
		2 METHOD
2.1	**Test Substance (Biocidal Product)**	[redacted]Glutaraldehyde) [redacted]% aqueous Glutaraldehyde active substance
2.1.1	Trade name/ proposed trade name	[redacted]
2.1.2	Composition of Product tested	[redacted] solutions of glutaraldehyde active substance [redacted] in sterile distilled water
2.1.3	Physical state and nature	Solution
2.1.4	Monitoring of active substance concentration	No
2.1.5	Method of analysis	Quantitative Suspension Test. Approximately 1.5 – 5.0 x 10^7 cfu/ml inoculum of [redacted] formed the initial test inoculum Contact times were: BS EN 1275: [redacted] BS EN 1650 [redacted]

		Soil conditions : BS EN 1275: None present BS EN 1650 Clean – 0.3g/l Bovine Albumin Dirty - 3.0g/l Bovine Albumin
		The final concentrations of the active substance Glutaraldehyde were as follows: [redacted]
		Criteria for passing the test: At least a 4 $\log_{10}$ reduction. Recovery employed a glutaraldehyde inactivation step utilising a recovery medium comprising of 30ml/L Polysorbate 80 + 3g/L Lecithin + 10g/L Histidine + 30g/L Tryptone Soy Broth powder (Oxoid).
2.2	**Reference substance**	No
2.2.1	Method of analysis for reference substance	Not tested
2.3	**Testing procedure**	
2.3.1	Test population / inoculum / test organism	[redacted]
2.3.2	Test system	BS EN 1275 - Basic Fungicidal Activity BS EN 1650 – Fungicidal Activity, Biocidal products for the Industrial and Institutional Disinfection Market [redacted] At least a 4 $\log_{10}$ reduction was a requirement for recording a "PASS" in the test.
2.3.3	Application of TS	The test systems contained the final concentrations of the active substance Glutaraldehyde detailed as follows: [redacted]
2.3.4	Test conditions	The test temperature was 20°C
2.3.5	Duration of the test	The exposure times were [redacted]

	/ Exposure time	
2.3.6	Number of replicates performed	One
2.3.7	Controls	0 mg/l (ppm) glutaraldehyde
2.4	**Examination**	
2.4.1	Effect investigated	Kill
2.4.2	Method for recording / scoring of the effect	Scoring was achieved by subtracting the number of survivors from the initial in-test inoculum. A resulting differential greater than 4 log_{10} was required to record a "PASS".
2.4.3	Intervals of examination	[redacted]
2.4.4	Statistics	None
2.4.5	Post monitoring of the test organism	None
	3 RESULTS	
3.1	**Efficacy**	The standard test allowed for measured degrees of efficacy as it was scored on a "Pass/FAIL" basis, the criteria for which were set as greater than 4 log_{10} reduction. The measured degree of efficacy was arrived at by comparing effect at three exposure intervals and at two incorporation levels. The active substance PASSED both the BS EN 1275 and BS EN 1650 tests (reduced the fungal spore inoculum by at least 4 log_{10}). [redacted]
3.1.1	Dose/Efficacy curve	Not applicable
3.1.2	Begin and duration of effects	The reduction observed at the [redacted]
3.1.3	Observed effects in the post monitoring phase	There was no post monitoring phase
3.2	**Effects against**	No adverse effects were observed

	organisms or objects to be protected	
3.3	**Other effects**	No other effects were observed
3.4	**Efficacy of the reference substance**	A reference substance was not tested
3.5	**Tabular and/or graphical presentation of the summarised results**	**BS EN 1275 – Basic Antifungal Activity** [redacted] **BS EN 1650 – Industrial & Institutional Uses – Clean (0.3g/l soil)** [redacted] **BS EN 1650 – Industrial & Institutional Uses – Dirty (3.0g/l soil)** [redacted]
3.6	**Efficacy limiting factors**	There were no limiting factors observed during the test. Exposure time was relevant but exposure time was sufficient to allow a "PASS" to be recorded. Concentration was also relevant, the higher test concentration allowed for the "PASS" criteria to [redacted]
3.6.1	Occurrences of	There was no evidence or observance of resistance