Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**		

Input values

Component	Certification range		Emissions limit value			Confidence interval		
CO	300.00	mg/m³	1,000.00	mg/m³		**10**	%	
CO2	25.00	Vol%	25.00	Vol%	*	**20**	%	*
NO	400.00	mg/m³	650.00	mg/m³	**	**20**	%	
NO2	100.00	mg/m³	100.00	mg/m³		**20**	%	
N2O	50.00	mg/m³	50.00	mg/m³	*	**20**	%	*
SO2	300.00	mg/m³	400.00	mg/m³		**20**	%	
HCl	90.00	mg/m³	100.00	mg/m³		**40**	%	
HF	10.00	mg/m³	10.00	mg/m³		**40**	%	
NH3	50.00	mg/m³	60.00	mg/m³	*	**40**	%	*
H2O	40.00	Vol%	40.00	Vol%	*	**40**	%	*
CH4	50.00	mg/m³		mg/m³	*	**20**	%	*
Corg	50.00	mg/m³	100.00	mg/m³		**30**	%	
O2	21.00	Vol%	25.00	Vol%	*	**20**	%	*

* For this measuring component no emlission limit values and confidence intervals are defined: Therefore full scale values and exemplary confidence intervals are used here.

** The emissions limit value for NOx is give as NO2-concentration, therefore the value as NO-concentration is decreased by the factor 1.53.

Interferent	Concentration		Interferent	Concentration	
Oxygen (O2)	3.00	Vol%	Ammonia (NH3)	20.00	mg/m³
Oxygen (O2)	21.00	Vol%	Sulfur dioxide (SO2)	200.00	mg/m³
Water (H2O)	30.00	Vol%	Sulfur dioxide (SO2)	1,000.00	mg/m³
Carbon monoxide (CO)	300.00	mg/m³	Hydrogen chloride (HCl)	50.00	mg/m³
Carbon dioxide (CO2)	15.00	Vol%	Hydrogen chloride (HCl)	200.00	mg/m³
Methane (CH4)	50.00	mg/m³			
Dinitrogen oxide (N2O)	20.00	mg/m³			
Dinitrogen oxide (N2O)	100.00	mg/m³			
Nitrogen monoxide (NO)	300.00	mg/m³			
Nitrogen dioxide (NO2)	30.00	mg/m³			

Required quality of the measurement

Requirement to response time	25	% **	Requirement of the legislation, the customer or authority
Averaging time of measured values	30	min	

*** Possible values are 25% for dynamic (standard) or 10 % for highly dynamic processes (EN ISO 14956, 7.2)*

Summary of the results

Component	Response time	s(AMS) values		Quality of the measurement
		Zero point	Span point	
CO	Requirements fulfilled	6.5727	9.0515	Requirements fulfilled
CO2	Requirements fulfilled	0.6360	0.7807	Requirements fulfilled
NO	Requirements fulfilled	10.0161	13.9600	Requirements fulfilled
NO2	Requirements fulfilled	3.4784	3.6244	Requirements fulfilled
N2O	Requirements fulfilled	1.0292	1.3577	Requirements fulfilled
SO2	Requirements fulfilled	8.1319	11.7655	Requirements fulfilled
HCl	Requirements fulfilled	3.3212	3.6177	Requirements fulfilled
HF	Requirements fulfilled	0.4901	0.4225	Requirements fulfilled
NH3	Requirements fulfilled	1.5732	1.4275	Requirements fulfilled
H2O	Requirements fulfilled	0.9910	1.0581	Requirements fulfilled
CH4				
Corg	Requirements fulfilled	2.3356	2.2500	Requirements fulfilled
O2	Requirements fulfilled	0.2816	0.3226	Requirements fulfilled

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Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**CO**

Input values

Certification range	300	mg/m³	Requirement to response time	25	%
Emissions limit value	1,000	mg/m³	Averaging time of measured values	30	min
Confidence interval	10	%			

Genaral information

Maintenance interval	6	months	**Detection limit**	0.32	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	2.97	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	0.00	mg/m³	**3.00**	mg/m³
300 mg/m³ Carbon monoxide (CO)				
15 Vol% Carbon dioxide (CO2)	**4.80**	mg/m³	0.00	mg/m³
50 mg/m³ Methane (CH4)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	**-5.40**	mg/m³	**-10.50**	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	0.00	mg/m³	0.00	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Ammonia (NH3)	0.00	mg/m³	**2.10**	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³

Sum of the positive cross-sensitivities	4.80	mg/m³	5.10	mg/m³
Sum of the negative cross-sensitivities	-5.40	mg/m³	-10.50	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**CO**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	6.00	mg/m³	6.00	mg/m³
Zero drift from the field test	4.50	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	-5.40	mg/m³
Influence of ambient temperature at span point	0.60	mg/m³	-5.10	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.30	mg/m³
Influence of voltage	0.60	mg/m³	0.90	mg/m³
Cross-sensitivity	-5.40	mg/m³	-10.50	mg/m³
Repeatability at span point	0.16	mg/m³	0.22	mg/m³
Standard deviation from paired maesurements under field conditions	2.73	mg/m³	2.73	mg/m³
Uncertainty of provided reference material	6.00	mg/m³	6.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	3.4641	mg/m³	3.4641	mg/m³
Zero drift from the field test	$u_{d,z}$	=	2.5981	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	-3.1177	mg/m³
Influence of ambient temperature at span point	u_t	=	0.3464	mg/m³	-2.9445	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.1732	mg/m³
Influence of voltage	u_v	=	0.3464	mg/m³	0.5196	mg/m³
Cross-sensitivity	u_i	=	-3.1177	mg/m³	-6.0622	mg/m³
Repeatability at span point	u_r	=	0.0924	mg/m³	0.1270	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	1.5780	mg/m³	1.5780	mg/m³
Uncertainty of provided reference material	u_{rm}	=	3.4641	mg/m³	3.4641	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	6.5727	mg/m³	9.0515	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	9.42	mg/m³	according to EN 15267-3
Expanded uncertainty	18.46	mg/m³	according to EN 15267-3
Relative expanded uncertainty	1.85	%	of the emissions limit value of 1000 mg/m³
Allowed expanded uncertainty	10.00	%	of the emissions limit value of 1000 mg/m³
Allowed expanded uncertainty	100.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**CO2**

Input values

Certification range	25	Vol%		Requirement to response time	25	%
Measuring range	25	Vol%		Averaging time of measured values	30	min
Confidence interval	20	%	*			

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Genaral information

Maintenance interval	3	months	**Detection limit**	0.06	Vol%

Required performance regarding dynamic operating conditions

Measured response time	3.03	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result — **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	Vol%	0.00	Vol%
21 Vol% Oxygen (O2)	0.00	Vol%	0.00	Vol%
30 Vol% Water (H2O)	**-0.33**	Vol%	**0.48**	Vol%
300 mg/m³ Carbon monoxide (CO)	0.00	Vol%	0.00	Vol%
15 Vol% Carbon dioxide (CO2)				
50 mg/m³ Methane (CH4)	0.00	Vol%	0.00	Vol%
20 mg/m³ Dinitrogen oxide (N2O)	0.00	Vol%	0.00	Vol%
100 mg/m³ Dinitrogen oxide (N2O)	**-0.40**	Vol%	**-0.35**	Vol%
300 mg/m³ Nitrogen monoxide (NO)	0.00	Vol%	0.00	Vol%
30 mg/m³ Nitrogen dioxide (NO2)	0.00	Vol%	0.00	Vol%
20 mg/m³ Ammonia (NH3)	0.00	Vol%	**-0.35**	Vol%
200 mg/m³ Sulfur dioxide (SO2)	0.00	Vol%	0.00	Vol%
1000 mg/m³ Sulfur dioxide (SO2)	0.00	Vol%	**0.33**	Vol%
50 mg/m³ Hydrogen chloride (HCl)	0.00	Vol%	0.00	Vol%
200 mg/m³ Hydrogen chloride (HCl)	0.00	Vol%	**-0.13**	Vol%

Sum of the positive cross-sensitivities	0.00	Vol%	0.80	Vol%
Sum of the negative cross-sensitivities	-0.73	Vol%	-0.83	Vol%

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**CO2**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	0.18	Vol%	0.18	Vol%
Zero drift from the field test	0.53	Vol%	0.00	Vol%
Span drift from the field test	0.00	Vol%	0.68	Vol%
Influence of ambient temperature at span point	0.08	Vol%	0.53	Vol%
Influence of sample gas pressure	0.00	Vol%	0.00	Vol%
Influence of sample gas flow	0.00	Vol%	-0.03	Vol%
Influence of voltage	-0.03	Vol%	0.10	Vol%
Cross-sensitivity	-0.73	Vol%	-0.83	Vol%
Repeatability at span point	0.03	Vol%	0.05	Vol%
Standard deviation from paired maesurements under field conditions	0.35	Vol%	0.35	Vol%
Uncertainty of provided reference material	0.50	Vol%	0.50	Vol%
Misalignment	0.00	Vol%	0.00	Vol%
Convertion rate of AMS for measurement of NOx	0.00	Vol%	0.00	Vol%
Changes of response fasctors	0.00	Vol%	0.00	Vol%

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	0.1010	Vol%	0.1010	Vol%
Zero drift from the field test	$u_{d,z}$	=	0.3031	Vol%	0.0000	Vol%
Span drift from the field test	$u_{d,s}$	=	0.0000	Vol%	0.3897	Vol%
Influence of ambient temperature at span point	u_t	=	0.0433	Vol%	0.3031	Vol%
Influence of sample gas pressure	u_p	=	0.0000	Vol%	0.0000	Vol%
Influence of sample gas flow	u_f	=	0.0000	Vol%	-0.0144	Vol%
Influence of voltage	u_v	=	-0.0144	Vol%	0.0577	Vol%
Cross-sensitivity	u_i	=	-0.4186	Vol%	-0.4763	Vol%
Repeatability at span point	u_r	=	0.0173	Vol%	0.0289	Vol%
Standard deviation from paired maesurements under field conditions	u_D	=	0.2046	Vol%	0.2046	Vol%
Uncertainty of provided reference material	u_{rm}	=	0.2887	Vol%	0.2887	Vol%
Misalignment	u_{mb}	=	0.0000	Vol%	0.0000	Vol%
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	Vol%	0.0000	Vol%
Changes of response fasctors	u_{rf}	=	0.0000	Vol%	0.0000	Vol%

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	0.6360	Vol%	0.7807	Vol%

Verification of compliance with the requirements

Combined standard uncertainty	0.84	Vol%	according to EN 15267-3
Expanded uncertainty	1.64	Vol%	according to EN 15267-3
Relative expanded uncertainty	6.57	%	of the measuring range of 25 Vol%
Allowed expanded uncertainty	20.00	%	of the measuring range of 25 Vol%
Allowed expanded uncertainty	5.00	Vol%	

Result **Requirements fulfilled**

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**NO**

Input values

Certification range	400	mg/m³	Requirement to response time	25	%
Emissions limit value	650	mg/m³	Averaging time of measured values	30	min
Confidence interval	20	%			

Genaral information

Maintenance interval	6	months	**Detection limit**	0.76	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	2.93	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	**-10.40**	mg/m³	**6.40**	mg/m³
300 mg/m³ Carbon monoxide (CO)	0.00	mg/m³	0.00	mg/m³
15 Vol% Carbon dioxide (CO2)	0.00	mg/m³	**-9.60**	mg/m³
50 mg/m³ Methane (CH4)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	**4.00**	mg/m³
300 mg/m³ Nitrogen monoxide (NO)				
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Ammonia (NH3)	**2.80**	mg/m³	0.00	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	**2.40**	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	**3.20**	mg/m³

Sum of the positive cross-sensitivities	2.80	mg/m³	16.00	mg/m³
Sum of the negative cross-sensitivities	-10.40	mg/m³	-9.60	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**NO**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	6.00	mg/m³	6.00	mg/m³
Zero drift from the field test	7.20	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	-12.00	mg/m³
Influence of ambient temperature at span point	-1.60	mg/m³	-6.00	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.40	mg/m³
Influence of voltage	0.40	mg/m³	-3.20	mg/m³
Cross-sensitivity	-10.40	mg/m³	16.00	mg/m³
Repeatability at span point	0.38	mg/m³	0.78	mg/m³
Standard deviation from paired maesurements under field conditions	6.18	mg/m³	6.18	mg/m³
Uncertainty of provided reference material	8.00	mg/m³	8.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	3.4641	mg/m³	3.4641	mg/m³
Zero drift from the field test	$u_{d,z}$	=	4.1569	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	-6.9282	mg/m³
Influence of ambient temperature at span point	u_t	=	-0.9238	mg/m³	-3.4641	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.2309	mg/m³
Influence of voltage	u_v	=	0.2309	mg/m³	-1.8475	mg/m³
Cross-sensitivity	u_i	=	-6.0044	mg/m³	9.2376	mg/m³
Repeatability at span point	u_r	=	0.2194	mg/m³	0.4503	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	3.5705	mg/m³	3.5705	mg/m³
Uncertainty of provided reference material	u_{rm}	=	4.6188	mg/m³	4.6188	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	10.0161	mg/m³	13.9600	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	14.57	mg/m³	according to EN 15267-3
Expanded uncertainty	28.55	mg/m³	according to EN 15267-3
Relative expanded uncertainty	4.39	%	of the emissions limit value of 650 mg/m³
Allowed expanded uncertainty	20.00	%	of the emissions limit value of 650 mg/m³
Allowed expanded uncertainty	130.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**NO2**

Input values

Certification range	100	mg/m³	Requirement to response time	25	%
Emissions limit value	100	mg/m³	Averaging time of measured values	30	min
Confidence interval	20	%			

Genaral information

Maintenance interval	6	months	**Detection limit**	0.38	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	3.30	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	**-1.50**	mg/m³	**1.00**	mg/m³
300 mg/m³ Carbon monoxide (CO)	0.00	mg/m³	0.00	mg/m³
15 Vol% Carbon dioxide (CO2)	**0.50**	mg/m³	**-1.10**	mg/m³
50 mg/m³ Methane (CH4)	**-0.90**	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	**1.00**	mg/m³	0.00	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	**3.20**	mg/m³	**3.00**	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)				
20 mg/m³ Ammonia (NH3)	0.00	mg/m³	**-1.00**	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	**-2.60**	mg/m³

Sum of the positive cross-sensitivities	4.70	mg/m³	4.00	mg/m³
Sum of the negative cross-sensitivities	-2.40	mg/m³	-4.70	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**NO2**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	1.40	mg/m³	1.40	mg/m³
Zero drift from the field test	-2.30	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	3.00	mg/m³
Influence of ambient temperature at span point	1.30	mg/m³	0.90	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.10	mg/m³
Influence of voltage	0.30	mg/m³	-0.60	mg/m³
Cross-sensitivity	4.70	mg/m³	-4.70	mg/m³
Repeatability at span point	0.19	mg/m³	0.47	mg/m³
Standard deviation from paired maesurements under field conditions	1.09	mg/m³	1.09	mg/m³
Uncertainty of provided reference material	2.00	mg/m³	2.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	0.8083	mg/m³	0.8083	mg/m³
Zero drift from the field test	$u_{d,z}$	=	-1.3279	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	1.7321	mg/m³
Influence of ambient temperature at span point	u_t	=	0.7506	mg/m³	0.5196	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.0577	mg/m³
Influence of voltage	u_v	=	0.1732	mg/m³	-0.3464	mg/m³
Cross-sensitivity	u_i	=	2.7135	mg/m³	-2.7135	mg/m³
Repeatability at span point	u_r	=	0.1097	mg/m³	0.2714	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	0.6267	mg/m³	0.6267	mg/m³
Uncertainty of provided reference material	u_{rm}	=	1.1547	mg/m³	1.1547	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	3.4784	mg/m³	3.6244	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	3.86	mg/m³	according to EN 15267-3
Expanded uncertainty	7.57	mg/m³	according to EN 15267-3
Relative expanded uncertainty	7.57	%	of the emissions limit value of 100 mg/m³
Allowed expanded uncertainty	20.00	%	of the emissions limit value of 100 mg/m³
Allowed expanded uncertainty	20.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**N2O**

Input values

Certification range	50	mg/m³		Requirement to response time	25	%
Measuring range	50	mg/m³		Averaging time of measured values	30	min
Confidence interval	20	%	*			

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Genaral information

Maintenance interval	6	months	**Detection limit**	0.08	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	2.92	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	**0.40**	mg/m³	**0.80**	mg/m³
30 Vol% Water (H2O)	**-0.50**	mg/m³	**-0.80**	mg/m³
300 mg/m³ Carbon monoxide (CO)	0.00	mg/m³	**-0.30**	mg/m³
15 Vol% Carbon dioxide (CO2)	**-0.70**	mg/m³	0.00	mg/m³
50 mg/m³ Methane (CH4)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)				
100 mg/m³ Dinitrogen oxide (N2O)				
300 mg/m³ Nitrogen monoxide (NO)	**0.95**	mg/m³	**0.95**	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Ammonia (NH3)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³

Sum of the positive cross-sensitivities	1.35	mg/m³	1.75	mg/m³
Sum of the negative cross-sensitivities	-1.20	mg/m³	-1.10	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**N2O**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	0.50	mg/m³	0.50	mg/m³
Zero drift from the field test	0.25	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	-0.90	mg/m³
Influence of ambient temperature at span point	0.10	mg/m³	-0.55	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.05	mg/m³
Influence of voltage	0.05	mg/m³	0.20	mg/m³
Cross-sensitivity	1.35	mg/m³	1.75	mg/m³
Repeatability at span point	0.04	mg/m³	0.25	mg/m³
Standard deviation from paired maesurements under field conditions	0.17	mg/m³	0.17	mg/m³
Uncertainty of provided reference material	1.00	mg/m³	1.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	0.2887	mg/m³	0.2887	mg/m³
Zero drift from the field test	$u_{d,z}$	=	0.1443	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	-0.5196	mg/m³
Influence of ambient temperature at span point	u_t	=	0.0577	mg/m³	-0.3175	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.0289	mg/m³
Influence of voltage	u_v	=	0.0289	mg/m³	0.1155	mg/m³
Cross-sensitivity	u_i	=	0.7794	mg/m³	1.0104	mg/m³
Repeatability at span point	u_r	=	0.0231	mg/m³	0.1443	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	0.1009	mg/m³	0.1009	mg/m³
Uncertainty of provided reference material	u_{rm}	=	0.5774	mg/m³	0.5774	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	1.0292	mg/m³	1.3577	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	1.37	mg/m³	according to EN 15267-3
Expanded uncertainty	2.68	mg/m³	according to EN 15267-3
Relative expanded uncertainty	5.35	%	of the measuring range of 50 mg/m³
Allowed expanded uncertainty	20.00	%	of the measuring range of 50 mg/m³
Allowed expanded uncertainty	10.00	mg/m³	

Result **Requirements fulfilled**

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**SO2**

Input values

Certification range	300	mg/m³	Requirement to response time	25	%
Emissions limit value	400	mg/m³	Averaging time of measured values	30	min
Confidence interval	20	%			

Genaral information

Maintenance interval	6	months	**Detection limit**	0.24	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	3.05	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	**5.10**	mg/m³	**6.60**	mg/m³
300 mg/m³ Carbon monoxide (CO)	0.00	mg/m³	**3.30**	mg/m³
15 Vol% Carbon dioxide (CO2)	**3.00**	mg/m³	**1.50**	mg/m³
50 mg/m³ Methane (CH4)	0.00	mg/m³	**1.50**	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	**1.50**	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	0.00	mg/m³	0.00	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Ammonia (NH3)	0.00	mg/m³	**1.50**	mg/m³
200 mg/m³ Sulfur dioxide (SO2)				
1000 mg/m³ Sulfur dioxide (SO2)				
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³

Sum of the positive cross-sensitivities	8.10	mg/m³	15.90	mg/m³
Sum of the negative cross-sensitivities	0.00	mg/m³	0.00	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**SO2**

Influences of the process characteristics

Process characteristics	Largest difference according to type approval Zero point		Span point	
Lack-of-fit (Linearity)	3.30	mg/m³	3.30	mg/m³
Zero drift from the field test	-7.50	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	9.30	mg/m³
Influence of ambient temperature at span point	3.90	mg/m³	-4.50	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.30	mg/m³
Influence of voltage	-2.40	mg/m³	0.30	mg/m³
Cross-sensitivity	8.10	mg/m³	15.90	mg/m³
Repeatability at span point	0.12	mg/m³	0.16	mg/m³
Standard deviation from paired maesurements under field conditions	2.94	mg/m³	2.94	mg/m³
Uncertainty of provided reference material	6.00	mg/m³	6.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			Standard uncertainty Zero point		Span point	
Lack-of-fit (Linearity)	u_{lof}	=	1.9053	mg/m³	1.9053	mg/m³
Zero drift from the field test	$u_{d,z}$	=	-4.3301	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	5.3694	mg/m³
Influence of ambient temperature at span point	u_t	=	2.2517	mg/m³	-2.5981	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.1732	mg/m³
Influence of voltage	u_v	=	-1.3856	mg/m³	0.1732	mg/m³
Cross-sensitivity	u_i	=	4.6765	mg/m³	9.1799	mg/m³
Repeatability at span point	u_r	=	0.0693	mg/m³	0.0924	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	1.6994	mg/m³	1.6994	mg/m³
Uncertainty of provided reference material	u_{rm}	=	3.4641	mg/m³	3.4641	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		Span point	
Combined standard uncertainty	**s(AMS) values**	8.1319	mg/m³	11.7655	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	12.61	mg/m³	according to EN 15267-3
Expanded uncertainty	24.72	mg/m³	according to EN 15267-3
Relative expanded uncertainty	6.18	%	of the emissions limit value of 400 mg/m³
Allowed expanded uncertainty	20.00	%	of the emissions limit value of 400 mg/m³
Allowed expanded uncertainty	80.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**HCl**

Input values

Certification range	90	mg/m³	Requirement to response time	25	%
Emissions limit value	100	mg/m³	Averaging time of measured values	30	min
Confidence interval	40	%			

Genaral information

Maintenance interval	6	months	**Detection limit**	0.08	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	3.18	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	0.00	mg/m³	0.00	mg/m³
300 mg/m³ Carbon monoxide (CO)	0.00	mg/m³	0.00	mg/m³
15 Vol% Carbon dioxide (CO2)	**0.54**	mg/m³	0.00	mg/m³
50 mg/m³ Methane (CH4)	**0.81**	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	**1.35**	mg/m³	**1.71**	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	**0.54**	mg/m³	0.00	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	**2.07**	mg/m³
20 mg/m³ Ammonia (NH3)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	**1.08**	mg/m³	0.00	mg/m³
50 mg/m³ Hydrogen chloride (HCl)				
200 mg/m³ Hydrogen chloride (HCl)				

Sum of the positive cross-sensitivities	4.32	mg/m³	3.78	mg/m³
Sum of the negative cross-sensitivities	0.00	mg/m³	0.00	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**HCl**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	1.80	mg/m³	1.80	mg/m³
Zero drift from the field test	-2.52	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	2.70	mg/m³
Influence of ambient temperature at span point	0.72	mg/m³	-3.15	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.09	mg/m³
Influence of voltage	-0.45	mg/m³	0.63	mg/m³
Cross-sensitivity	4.32	mg/m³	3.78	mg/m³
Repeatability at span point	0.04	mg/m³	0.15	mg/m³
Standard deviation from paired maesurements under field conditions	0.94	mg/m³	0.94	mg/m³
Uncertainty of provided reference material	1.80	mg/m³	1.80	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	1.0392	mg/m³	1.0392	mg/m³
Zero drift from the field test	$u_{d,z}$	=	-1.4549	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	1.5588	mg/m³
Influence of ambient temperature at span point	u_t	=	0.4157	mg/m³	-1.8187	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.0520	mg/m³
Influence of voltage	u_v	=	-0.2598	mg/m³	0.3637	mg/m³
Cross-sensitivity	u_i	=	2.4942	mg/m³	2.1824	mg/m³
Repeatability at span point	u_r	=	0.0231	mg/m³	0.0866	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	0.5410	mg/m³	0.5410	mg/m³
Uncertainty of provided reference material	u_{rm}	=	1.0392	mg/m³	1.0392	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	3.3212	mg/m³	3.6177	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	4.08	mg/m³	according to EN 15267-3
Expanded uncertainty	8.00	mg/m³	according to EN 15267-3
Relative expanded uncertainty	8.00	%	of the emissions limit value of 100 mg/m³
Allowed expanded uncertainty	40.00	%	of the emissions limit value of 100 mg/m³
Allowed expanded uncertainty	40.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**HF**

Input values

Certification range	10	mg/m³	Requirement to response time	25	%
Emissions limit value	10	mg/m³	Averaging time of measured values	30	min
Confidence interval	40	%			

Genaral information

Maintenance interval	3	months	**Detection limit**	0.08	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	3.30	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	**0.15**	mg/m³	0.00	mg/m³
300 mg/m³ Carbon monoxide (CO)	**-0.28**	mg/m³	**-0.25**	mg/m³
15 Vol% Carbon dioxide (CO2)	0.00	mg/m³	0.00	mg/m³
50 mg/m³ Methane (CH4)	**0.23**	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	0.00	mg/m³	0.00	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	**0.15**	mg/m³
20 mg/m³ Ammonia (NH3)	**0.10**	mg/m³	0.00	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	**0.10**	mg/m³	**-0.10**	mg/m³

Sum of the positive cross-sensitivities	0.58	mg/m³	0.15	mg/m³
Sum of the negative cross-sensitivities	-0.28	mg/m³	-0.35	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**HF**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	0.17	mg/m³	0.17	mg/m³
Zero drift from the field test	-0.39	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	-0.30	mg/m³
Influence of ambient temperature at span point	-0.37	mg/m³	0.47	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.01	mg/m³
Influence of voltage	0.10	mg/m³	0.13	mg/m³
Cross-sensitivity	0.58	mg/m³	-0.35	mg/m³
Repeatability at span point	0.04	mg/m³	0.05	mg/m³
Standard deviation from paired maesurements under field conditions	0.13	mg/m³	0.13	mg/m³
Uncertainty of provided reference material	0.20	mg/m³	0.20	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	0.0981	mg/m³	0.0981	mg/m³
Zero drift from the field test	$u_{d,z}$	=	-0.2252	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	-0.1732	mg/m³
Influence of ambient temperature at span point	u_t	=	-0.2136	mg/m³	0.2714	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.0058	mg/m³
Influence of voltage	u_v	=	0.0577	mg/m³	0.0751	mg/m³
Cross-sensitivity	u_i	=	0.3349	mg/m³	-0.2021	mg/m³
Repeatability at span point	u_r	=	0.0231	mg/m³	0.0289	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	0.0736	mg/m³	0.0736	mg/m³
Uncertainty of provided reference material	u_{rm}	=	0.1155	mg/m³	0.1155	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	0.4901	mg/m³	0.4225	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	0.55	mg/m³	according to EN 15267-3
Expanded uncertainty	1.07	mg/m³	according to EN 15267-3
Relative expanded uncertainty	10.74	%	of the emissions limit value of 10 mg/m³
Allowed expanded uncertainty	40.00	%	of the emissions limit value of 10 mg/m³
Allowed expanded uncertainty	4.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**NH3**

Input values

Certification range	50	mg/m³		Requirement to response time	25	%
Measuring range	60	mg/m³		Averaging time of measured values	30	min
Confidence interval	40	%	*			

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Genaral information

Maintenance interval	3	months	**Detection limit**	0.05	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	3.32	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	**0.40**	mg/m³	0.00	mg/m³
300 mg/m³ Carbon monoxide (CO)	**0.35**	mg/m³	0.00	mg/m³
15 Vol% Carbon dioxide (CO2)	**0.45**	mg/m³	**-0.50**	mg/m³
50 mg/m³ Methane (CH4)	**0.60**	mg/m³	**-0.20**	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	**0.20**	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	**0.65**	mg/m³	**-0.50**	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	0.00	mg/m³	**-0.25**	mg/m³
20 mg/m³ Ammonia (NH3)				
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³

Sum of the positive cross-sensitivities	2.45	mg/m³	0.20	mg/m³
Sum of the negative cross-sensitivities	0.00	mg/m³	-1.45	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**NH3**

Influences of the process characteristics

Process characteristics	Largest difference according to type approval Zero point		Span point	
Lack-of-fit (Linearity)	-0.30	mg/m³	-0.30	mg/m³
Zero drift from the field test	0.25	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	1.47	mg/m³
Influence of ambient temperature at span point	-0.25	mg/m³	-0.70	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.00	mg/m³	-0.05	mg/m³
Influence of voltage	-0.25	mg/m³	0.35	mg/m³
Cross-sensitivity	2.45	mg/m³	-1.45	mg/m³
Repeatability at span point	0.02	mg/m³	0.07	mg/m³
Standard deviation from paired maesurements under field conditions	0.38	mg/m³	0.38	mg/m³
Uncertainty of provided reference material	1.00	mg/m³	1.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	0.00	mg/m³	0.00	mg/m³

Process characteristics			Standard uncertainty Zero point		Span point	
Lack-of-fit (Linearity)	u_{lof}	=	-0.1732	mg/m³	-0.1732	mg/m³
Zero drift from the field test	$u_{d,z}$	=	0.1443	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	0.8487	mg/m³
Influence of ambient temperature at span point	u_t	=	-0.1443	mg/m³	-0.4041	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.0000	mg/m³	-0.0289	mg/m³
Influence of voltage	u_v	=	-0.1443	mg/m³	0.2021	mg/m³
Cross-sensitivity	u_i	=	1.4145	mg/m³	-0.8372	mg/m³
Repeatability at span point	u_r	=	0.0115	mg/m³	0.0404	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	0.2198	mg/m³	0.2198	mg/m³
Uncertainty of provided reference material	u_{rm}	=	0.5774	mg/m³	0.5774	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	0.0000	mg/m³	0.0000	mg/m³

Calculation of the combined standard uncertainties

		Zero point		Span point	
Combined standard uncertainty	**s(AMS) values**	1.5732	mg/m³	1.4275	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	1.83	mg/m³	according to EN 15267-3
Expanded uncertainty	3.59	mg/m³	according to EN 15267-3
Relative expanded uncertainty	5.99	%	of the measuring range of 60 mg/m³
Allowed expanded uncertainty	40.00	%	of the measuring range of 60 mg/m³
Allowed expanded uncertainty	24.00	mg/m³	

Result **Requirements fulfilled**

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**H2O**

Input values

Certification range	40	Vol%		Requirement to response time	25	%
Measuring range	40	Vol%		Averaging time of measured values	30	min
Confidence interval	40	%	*			

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Genaral information

Maintenance interval	6	months	**Detection limit**	0.04	Vol%

Required performance regarding dynamic operating conditions

Measured response time	2.93	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result — **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	Vol%	0.00	Vol%
21 Vol% Oxygen (O2)	0.00	Vol%	0.00	Vol%
30 Vol% Water (H2O)				
300 mg/m³ Carbon monoxide (CO)	**0.80**	Vol%	**0.76**	Vol%
15 Vol% Carbon dioxide (CO2)	0.00	Vol%	0.00	Vol%
50 mg/m³ Methane (CH4)	**-0.20**	Vol%	**-0.36**	Vol%
20 mg/m³ Dinitrogen oxide (N2O)	0.00	Vol%	0.00	Vol%
100 mg/m³ Dinitrogen oxide (N2O)	0.00	Vol%	0.00	Vol%
300 mg/m³ Nitrogen monoxide (NO)	0.00	Vol%	0.00	Vol%
30 mg/m³ Nitrogen dioxide (NO2)	0.00	Vol%	0.00	Vol%
20 mg/m³ Ammonia (NH3)	0.00	Vol%	**-0.20**	Vol%
200 mg/m³ Sulfur dioxide (SO2)	0.00	Vol%	0.00	Vol%
1000 mg/m³ Sulfur dioxide (SO2)	0.00	Vol%	0.00	Vol%
50 mg/m³ Hydrogen chloride (HCl)	0.00	Vol%	0.00	Vol%
200 mg/m³ Hydrogen chloride (HCl)	0.00	Vol%	**-0.20**	Vol%

Sum of the positive cross-sensitivities	0.80 Vol%	0.76 Vol%
Sum of the negative cross-sensitivities	-0.20 Vol%	-0.76 Vol%

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**H2O**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	0.64	Vol%	0.64	Vol%
Zero drift from the field test	-1.04	Vol%	0.00	Vol%
Span drift from the field test	0.00	Vol%	1.16	Vol%
Influence of ambient temperature at span point	0.12	Vol%	0.48	Vol%
Influence of sample gas pressure	0.00	Vol%	0.00	Vol%
Influence of sample gas flow	0.00	Vol%	-0.04	Vol%
Influence of voltage	0.08	Vol%	0.00	Vol%
Cross-sensitivity	0.80	Vol%	0.76	Vol%
Repeatability at span point	0.02	Vol%	0.06	Vol%
Standard deviation from paired maesurements under field conditions	0.39	Vol%	0.39	Vol%
Uncertainty of provided reference material	0.80	Vol%	0.80	Vol%
Misalignment	0.00	Vol%	0.00	Vol%
Convertion rate of AMS for measurement of NOx	0.00	Vol%	0.00	Vol%
Changes of response fasctors	0.00	Vol%	0.00	Vol%

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	0.3695	Vol%	0.3695	Vol%
Zero drift from the field test	$u_{d,z}$	=	-0.6004	Vol%	0.0000	Vol%
Span drift from the field test	$u_{d,s}$	=	0.0000	Vol%	0.6697	Vol%
Influence of ambient temperature at span point	u_t	=	0.0693	Vol%	0.2771	Vol%
Influence of sample gas pressure	u_p	=	0.0000	Vol%	0.0000	Vol%
Influence of sample gas flow	u_f	=	0.0000	Vol%	-0.0231	Vol%
Influence of voltage	u_v	=	0.0462	Vol%	0.0000	Vol%
Cross-sensitivity	u_i	=	0.4619	Vol%	0.4388	Vol%
Repeatability at span point	u_r	=	0.0115	Vol%	0.0346	Vol%
Standard deviation from paired maesurements under field conditions	u_D	=	0.2266	Vol%	0.2266	Vol%
Uncertainty of provided reference material	u_{rm}	=	0.4619	Vol%	0.4619	Vol%
Misalignment	u_{mb}	=	0.0000	Vol%	0.0000	Vol%
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	Vol%	0.0000	Vol%
Changes of response fasctors	u_{rf}	=	0.0000	Vol%	0.0000	Vol%

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	0.9910	Vol%	1.0581	Vol%

Verification of compliance with the requirements

Combined standard uncertainty	1.23	Vol%	according to EN 15267-3
Expanded uncertainty	2.40	Vol%	according to EN 15267-3
Relative expanded uncertainty	6.01	%	of the measuring range of 40 Vol%
Allowed expanded uncertainty	40.00	%	of the measuring range of 40 Vol%
Allowed expanded uncertainty	16.00	Vol%	

Result **Requirements fulfilled**

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**Corg**

Input values

Certification range	50	mg/m³	Requirement to response time	25	%
Emissions limit value	100	mg/m³	Averaging time of measured values	30	min
Confidence interval	30	%			

Genaral information

Maintenance interval	2	months	**Detection limit**	0	mg/m³

Required performance regarding dynamic operating conditions

Measured response time	0.82	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
21 Vol% Oxygen (O2)	0.00	mg/m³	0.00	mg/m³
30 Vol% Water (H2O)	**0.57**	mg/m³	**0.60**	mg/m³
300 mg/m³ Carbon monoxide (CO)	0.00	mg/m³	0.00	mg/m³
15 Vol% Carbon dioxide (CO2)	**0.44**	mg/m³	**-0.50**	mg/m³
50 mg/m³ Methane (CH4)	0.00	mg/m³	0.00	mg/m³
20 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
100 mg/m³ Dinitrogen oxide (N2O)	0.00	mg/m³	0.00	mg/m³
300 mg/m³ Nitrogen monoxide (NO)	**0.27**	mg/m³	0.00	mg/m³
30 mg/m³ Nitrogen dioxide (NO2)	**0.27**	mg/m³	0.00	mg/m³
20 mg/m³ Ammonia (NH3)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	0.00	mg/m³
1000 mg/m³ Sulfur dioxide (SO2)	0.00	mg/m³	**-0.27**	mg/m³
50 mg/m³ Hydrogen chloride (HCl)	0.00	mg/m³	0.00	mg/m³
200 mg/m³ Hydrogen chloride (HCl)	**0.27**	mg/m³	**0.30**	mg/m³

Sum of the positive cross-sensitivities	1.80	mg/m³	0.90	mg/m³
Sum of the negative cross-sensitivities	0.00	mg/m³	-0.77	mg/m³

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**Corg**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	0.34	mg/m³	0.34	mg/m³
Zero drift from the field test	0.88	mg/m³	0.00	mg/m³
Span drift from the field test	0.00	mg/m³	-1.41	mg/m³
Influence of ambient temperature at span point	0.70	mg/m³	-0.65	mg/m³
Influence of sample gas pressure	0.00	mg/m³	0.00	mg/m³
Influence of sample gas flow	0.30	mg/m³	-0.35	mg/m³
Influence of voltage	-0.05	mg/m³	0.25	mg/m³
Cross-sensitivity	1.80	mg/m³	0.90	mg/m³
Repeatability at span point	0.00	mg/m³	0.01	mg/m³
Standard deviation from paired maesurements under field conditions	0.15	mg/m³	0.15	mg/m³
Uncertainty of provided reference material	1.00	mg/m³	1.00	mg/m³
Misalignment	0.00	mg/m³	0.00	mg/m³
Convertion rate of AMS for measurement of NOx	0.00	mg/m³	0.00	mg/m³
Changes of response fasctors	3.27	mg/m³	3.27	mg/m³

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	0.1934	mg/m³	0.1934	mg/m³
Zero drift from the field test	$u_{d,z}$	=	0.5052	mg/m³	0.0000	mg/m³
Span drift from the field test	$u_{d,s}$	=	0.0000	mg/m³	-0.8112	mg/m³
Influence of ambient temperature at span point	u_t	=	0.4041	mg/m³	-0.3753	mg/m³
Influence of sample gas pressure	u_p	=	0.0000	mg/m³	0.0000	mg/m³
Influence of sample gas flow	u_f	=	0.1732	mg/m³	-0.2021	mg/m³
Influence of voltage	u_v	=	-0.0289	mg/m³	0.1443	mg/m³
Cross-sensitivity	u_i	=	1.0363	mg/m³	0.5196	mg/m³
Repeatability at span point	u_r	=	0.0000	mg/m³	0.0058	mg/m³
Standard deviation from paired maesurements under field conditions	u_D	=	0.0877	mg/m³	0.0877	mg/m³
Uncertainty of provided reference material	u_{rm}	=	0.5774	mg/m³	0.5774	mg/m³
Misalignment	u_{mb}	=	0.0000	mg/m³	0.0000	mg/m³
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	mg/m³	0.0000	mg/m³
Changes of response fasctors	u_{rf}	=	1.8850	mg/m³	1.8850	mg/m³

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	2.3356	mg/m³	2.2500	mg/m³

Verification of compliance with the requirements

Combined standard uncertainty	2.47	mg/m³	according to EN 15267-3
Expanded uncertainty	4.85	mg/m³	according to EN 15267-3
Relative expanded uncertainty	4.85	%	of the emissions limit value of 100 mg/m³
Allowed expanded uncertainty	30.00	%	of the emissions limit value of 100 mg/m³
Allowed expanded uncertainty	30.00	mg/m³	

Result **Requirements fulfilled**

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**O2**

Input values

Certification range	21	Vol%		Requirement to response time	25	%
Measuring range	25	Vol%		Averaging time of measured values	30	min
Confidence interval	20	%	*			

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.

Genaral information

Maintenance interval	4	weeks	**Detection limit**	0.03	Vol%

Required performance regarding dynamic operating conditions

Measured response time	2.27	min	
Requirement to response time	7.50	min	25% of the averaging time of 30 min

Result **Requirements fulfilled**

Calculation of the expanded uncertainty

Interferent	**Zero point**		**Span point**	
3 Vol% Oxygen (O2)				
21 Vol% Oxygen (O2)				
30 Vol% Water (H2O)	0.00	Vol%	0.00	Vol%
300 mg/m³ Carbon monoxide (CO)	0.00	Vol%	0.00	Vol%
15 Vol% Carbon dioxide (CO2)	0.00	Vol%	0.00	Vol%
50 mg/m³ Methane (CH4)	0.00	Vol%	0.00	Vol%
20 mg/m³ Dinitrogen oxide (N2O)	0.00	Vol%	0.00	Vol%
100 mg/m³ Dinitrogen oxide (N2O)	0.00	Vol%	0.00	Vol%
300 mg/m³ Nitrogen monoxide (NO)	0.00	Vol%	0.00	Vol%
30 mg/m³ Nitrogen dioxide (NO2)	0.00	Vol%	0.00	Vol%
20 mg/m³ Ammonia (NH3)	0.00	Vol%	0.00	Vol%
200 mg/m³ Sulfur dioxide (SO2)	0.00	Vol%	0.00	Vol%
1000 mg/m³ Sulfur dioxide (SO2)	0.00	Vol%	0.00	Vol%
50 mg/m³ Hydrogen chloride (HCl)	0.00	Vol%	0.00	Vol%
200 mg/m³ Hydrogen chloride (HCl)	0.00	Vol%	0.00	Vol%

Sum of the positive cross-sensitivities	0.00	Vol%	0.00	Vol%
Sum of the negative cross-sensitivities	0.00	Vol%	0.00	Vol%

Calculation of measurement uncertainty

according to EN ISO 14956, EN 14181 and EN 15267-3

Version 5.2

Device data

Customer	DGtek / Volund GMAB Margam		
Identification	ZTA-4943685		
Serial number	1628 0511	**Date**	2016-09-14
Measuring system	**MCS100FT**	**Component**	**O2**

Influences of the process characteristics

Process characteristics	**Largest difference according to type approval**			
	Zero point		**Span point**	
Lack-of-fit (Linearity)	-0.14	Vol%	-0.14	Vol%
Zero drift from the field test	0.18	Vol%	0.00	Vol%
Span drift from the field test	0.00	Vol%	-0.20	Vol%
Influence of ambient temperature at span point	0.02	Vol%	0.24	Vol%
Influence of sample gas pressure	0.00	Vol%	0.00	Vol%
Influence of sample gas flow	-0.02	Vol%	0.01	Vol%
Influence of voltage	0.01	Vol%	-0.10	Vol%
Cross-sensitivity	0.00	Vol%	0.00	Vol%
Repeatability at span point	0.01	Vol%	0.01	Vol%
Standard deviation from paired maesurements under field conditions	0.09	Vol%	0.09	Vol%
Uncertainty of provided reference material	0.42	Vol%	0.42	Vol%
Misalignment	0.00	Vol%	0.00	Vol%
Convertion rate of AMS for measurement of NOx	0.00	Vol%	0.00	Vol%
Changes of response fasctors	0.00	Vol%	0.00	Vol%

Process characteristics			**Standard uncertainty**			
			Zero point		**Span point**	
Lack-of-fit (Linearity)	u_{lof}	=	-0.0808	Vol%	-0.0808	Vol%
Zero drift from the field test	$u_{d,z}$	=	0.1039	Vol%	0.0000	Vol%
Span drift from the field test	$u_{d,s}$	=	0.0000	Vol%	-0.1155	Vol%
Influence of ambient temperature at span point	u_t	=	0.0115	Vol%	0.1386	Vol%
Influence of sample gas pressure	u_p	=	0.0000	Vol%	0.0000	Vol%
Influence of sample gas flow	u_f	=	-0.0115	Vol%	0.0058	Vol%
Influence of voltage	u_v	=	0.0058	Vol%	-0.0577	Vol%
Cross-sensitivity	u_i	=	0.0000	Vol%	0.0000	Vol%
Repeatability at span point	u_r	=	0.0058	Vol%	0.0058	Vol%
Standard deviation from paired maesurements under field conditions	u_D	=	0.0533	Vol%	0.0533	Vol%
Uncertainty of provided reference material	u_{rm}	=	0.2425	Vol%	0.2425	Vol%
Misalignment	u_{mb}	=	0.0000	Vol%	0.0000	Vol%
Convertion rate of AMS for measurement of NOx	u_{ce}	=	0.0000	Vol%	0.0000	Vol%
Changes of response fasctors	u_{rf}	=	0.0000	Vol%	0.0000	Vol%

Calculation of the combined standard uncertainties

		Zero point		**Span point**	
Combined standard uncertainty	**s(AMS) values**	0.2816	Vol%	0.3226	Vol%

Verification of compliance with the requirements

Combined standard uncertainty	0.34	Vol%	according to EN 15267-3
Expanded uncertainty	0.66	Vol%	according to EN 15267-3
Relative expanded uncertainty	2.66	%	of the measuring range of 25 Vol%
Allowed expanded uncertainty	20.00	%	of the measuring range of 25 Vol%
Allowed expanded uncertainty	5.00	Vol%	

Result **Requirements fulfilled**

Attention: The 2001/80/EC and 2000/76/EC gives no requirements for these components.