PRODUCT CONFORMITY CERTIFICATE

This is to certify that the

MAC GMS800

Manufactured by:

SICK AG

Poppenbütteler Bogen 9b
22399 Hamburg
Germany

Has been assessed by Sira Certification Service
And for the conditions stated on this certificate complies with:

MCERTS Performance Standards for Continuous Emission Monitoring Systems, Version 3.4 dated July 2012
EN15267-1:2009, EN15267-2:2009, EN15267-3:2007
& QAL 1 as defined in EN 14181: 2004

Certification Ranges :
CO : 0 to 75 mg/m^3 (UNOR) and 0 to 200 mg/m^3 (MULTOR);
NO : 0 to 100 mg/m^3 (UNOR) and 0 to 250 mg/m^3 (MULTOR) and 0 to 50 mg/m^3 (DEFOR);
NO_2 : 0 to 50 mg/m^3 (DEFOR); **NO_x :** 0 to 100 mg/m^3 (UNOR)
SO_2 : 0 to 75 mg/m^3 (UNOR) and 0 to 250 mg/m^3 (MULTOR) and 0 to 75 mg/m^3 (DEFOR);
CH_4 : 0 to 50 mg/m^3 (UNOR) and 0 to 286 mg/m^3 (MULTOR); **N_2O :** 0 to 50 mg/m^3 (UNOR); **CO_2 :** 0 to 25 %vol. (UNOR and MULTOR); **O_2 :** 0 to 25 %vol. (OXOR-P and OXOR-E)

See description for additional measuring ranges

Project No.	:	16A23053
Certificate No	:	Sira MC100182/04
Initial Certification	:	21 December 2010
This Certificate issued	:	21 December 2015
Renewal Date	:	20 December 2020

Joe Prince MSc, MInst MC
Deputy Certification Manager

MCERTS is operated on behalf of the Environment Agency by

Sira Certification Service
Unit 6, Hawarden Industrial Park
Hawarden, Deeside, CH5 3US
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Form 1335
Issue 2

Certificate Contents

Approved Site Application

Any potential user should ensure, in consultation with the manufacturer, that the monitoring system is suitable for the intended application. For general guidance on monitoring techniques refer to the Environment Agency Monitoring Technical Guidance Notes available at www.mcerts.net

On the basis of the assessment and the ranges required for compliance with EU Directives this instrument is considered suitable for use on waste incineration and large coal-fired combustion plant applications. This CEM has been proven suitable for its measuring task (parameter and composition of the flue gas) by use of the QAL 1 procedure specified in EN14181, for LCPD/IED Chapter III and IED Chapter IV applications for the ranges specified. The lowest certified range for each determinand shall not be more than 1.5X the daily average emission limit value (ELV) for IED Chapter IV applications, and not more than 2.5X the ELV for IED Chapter III and other types of application.

Basis of Certification

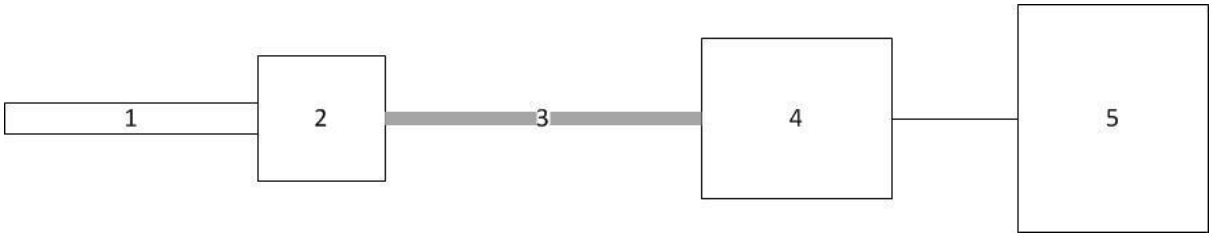
This certification is based on the following Test Report(s) and on Sira's assessment and ongoing surveillance of the product and the manufacturing process:

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH test report No.: 936/21211670/B dated March 26th 2010

Sira Report 16A23053 Rev 1 dated 19th October 2010

Product Certified

The MAC GMS800 measuring system consists of the following parts:



1. Sample Probe	2. Heated Filter	3. Heated Sample Line	4. Gas Conditioning	5. Analyser
Model: M&C SP 2000	Model: N/A – Heated filter is integrated with M&C SP 2000 sample probe	Model: Not Stated Length: 50m	Model: MAK 10-2 / CSS-V2SK	Model: UNOR MULTOR DEFOR OXOR-P/E

Allowable variations could include:

- A different brand or model of sampling system of the same type, provided that there is evidence the alternative system works with similar types of CEM.
- Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.

This certificate applies to all instruments fitted with software version T825_090707_1000 onwards. PC Software - Sopas ET 2.20 Build 2766 onwards, (serial number 10440002 onwards).

Certified Performance

The instrument was evaluated for use under the following conditions:

Ambient Temperature Range: +5 to +45°C with MAK 10-2 Cooler
+10 to +40°C with CSS-V2SK Cooler

If the instrument is supplied with an enclosure then the ambient temperature shall be monitored inside the enclosure to ensure that it stays within the above ambient temperature range.

Instrument IP rating: IP 54
Cooler IP rating: IP 34

Unless otherwise stated the evaluation was carried out on the following certification range: CO (UNOR) 0 to 75mg/m^3, CO (MULTOR) 0 to 200 mg/m^3, NO (UNOR) 0 to 100mg/m^3, NO (MULTOR) 0 to 250 mg/m^3, NO (DEFOR) 0 to 50 mg/m^3, NO_2 (DEFOR) 0 to 50 mg/m^3, NO_x (UNOR) 0-100 mg/m^3, SO_2 (UNOR) 0 to 75mg/m^3, SO_2 (MULTOR) 0 to 250 mg/m^3, SO_2 (DEFOR) 0 to 75 mg/m^3, CH_4 (UNOR) 0 to 50 mg/m^3, CH_4 (MULTOR) 0 to 286 mg/m^3, N_2O (UNOR) 0 to 50mg/m^3, CO_2 (UNOR) 0 to 25%vol., CO_2 (MULTOR) 0 to 25%vol., O_2 (OXOR-P) 0 to 25%vol. and O_2 (OXOR-E) 0 to 25%vol..

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Response time						
CO (UNOR)					48s	<200s
CO (MULTOR)					137s	<200s
NO (UNOR)					44s	<200s
NO (MULTOR)					117s	<200s
NO (DEFOR)					33s	<200s
NO_2 (DEFOR)					61s	<200s
SO_2 (UNOR)					155s	<200s
SO_2 (MULTOR)					158s	<200s
SO_2 (DEFOR)					133s	<200s
CH_4 (UNOR)					49s	<200s
CH_4 (MULTOR)					71s	<200s
N_2O (UNOR)					53s	<200s
CO_2 (UNOR)					44s	<200s
CO_2 (MULTOR)					95s	<200s
O_2 (OXOR-P)					33s	<200s
O_2 (OXOR-E)					44s	<200s
CO (UNOR) – (0 to 750mg/m^3)					38s	<200s

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CO (UNOR) – (0 to 3000mg/m^3)					39s	<200s
CO (MULTOR) – (0 to 2500mg/m^3)					98s	<200s
NO (UNOR) – (0 to 1000mg/m^3)					42s	<200s
NO (UNOR) – (0 to 2000mg/m^3)					37s	<200s
NO (MULTOR) – (0 to2500mg/m^3)					100s	<200s
NO (DEFOR) – (0 to 1000mg/m^3)					43s	<200s
NO (DEFOR) – (0 to 2000mg/m^3)					37s	<200s
NO_2 (DEFOR) – (0 to 500mg/m^3)					57s	<200s
SO_2 (UNOR) – (0 to 287mg/m^3)					97s	<200s
SO_2 (UNOR) – (0 to 2000mg/m^3)					43s	<200s
SO_2 (MULTOR) – (0 to 2000mg/m^3)					96s	<200s
SO_2 (DEFOR) – (0 to 287mg/m^3)					51s	<200s
SO_2 (DEFOR) – (0 to 2000mg/m^3)					41s	<200s
CH_4 (UNOR) – (0 to 500mg/m^3)					51s	<200s
CH_4 (MULTOR) – (0 to 500mg/m^3)					65s	<200s
N_2O (UNOR) – (0 to 500mg/m^3)					40s	<200s
Supplementary test 1 (NOx convertor):					Note 3	
NO_x (UNOR)					51s	<200s
CO (UNOR)					52s	<200s
Supplementary test 2 (Cooler CSS-V2SK*)*					Note 5	
NO (DEFOR)					63s	<200s
NO_2 (DEFOR)					74s	<200s
SO_2 (UNOR)					150s	<200s
SO_2 (DEFOR)					144s	<200s
CH_4 (UNOR)					41s	<200s
CH_4 (MULTOR)					83s	<200s
CO_2 (MULTOR)					81s	<200s
O_2 (OXOR-E)					46s	<200s

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability standard deviation at zero point						
CO (UNOR)	0.30					<2.0%
CO (MULTOR)	0.10					<2.0%
NO (UNOR)	0.40					<2.0%
NO (MULTOR)		0.80				<2.0%
NO (DEFOR)	0.10					<2.0%
NO_2 (DEFOR)	0.00					<2.0%
SO_2 (UNOR)	0.20					<2.0%
SO_2 (MULTOR)		0.70				<2.0%
SO_2 (DEFOR)	0.20					<2.0%
CH_4 (UNOR)		0.60				<2.0%
CH_4 (MULTOR)	0.00					<2.0%
N_2O (UNOR)	0.20					<2.0%
CO_2 (UNOR)	0.00					<2.0%
CO_2 (MULTOR)	0.00					<2.0%
O_2 (OXOR-P)	0.00					<0.2%
O_2 (OXOR-E)	0.20					<0.2%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Repeatability standard deviation at reference point						
CO (UNOR)	0.20					<2.0%
CO (MULTOR)	0.10					<2.0%
NO (UNOR)	0.20					<2.0%
NO (MULTOR)		0.60				<2.0%
NO (DEFOR)	0.20					<2.0%
NO_2 (DEFOR)			1.00			<2.0%
SO_2 (UNOR)	0.30					<2.0%
SO_2 (MULTOR)	0.20					<2.0%
SO_2 (DEFOR)	0.20					<2.0%
CH_4 (UNOR)			1.30			<2.0%
CH_4 (MULTOR)	0.20					<2.0%
N_2O (UNOR)		0.50				<2.0%
CO_2 (UNOR)	0.20					<2.0%
CO_2 (MULTOR)	0.10					<2.0%
O_2 (OXOR-P)	0.20					<0.2%
O_2 (OXOR-E)	0.30					<0.2%
Lack of fit						
CO (UNOR)		0.67				<2.0%
CO (MULTOR)		1.00				<2.0%
NO (UNOR)	0.40					<2.0%
NO (MULTOR)		-0.80				<2.0%
NO (DEFOR)	0.40					<2.0%
NO_2 (DEFOR)		-0.80				<2.0%
SO_2 (UNOR)		0.95				<2.0%
SO_2 (MULTOR)			-1.88			<2.0%
SO_2 (DEFOR)		-0.93				<2.0%
CH_4 (UNOR)		0.80				<2.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CH_4 (MULTOR)		-0.91				<2.0%
N_2O (UNOR)		0.80				<2.0%
CO_2 (UNOR)			-1.00			<2.0%
CO_2 (MULTOR)			-1.64			<2.0%
O_2 (OXOR-P)	-0.07					<0.2%
O_2 (OXOR-E)	-0.10					<0.2%
CO (UNOR) – (0 to 750mg/m^3)	0.45					<2.0%
CO (UNOR) – (0 to 3000mg/m^3)		0.57				<2.0%
CO (MULTOR) – (0 to 2500mg/m^3)		-1.00				<2.0%
NO (UNOR) – (0 to 1000mg/m^3)	-0.25					<2.0%
NO (UNOR) – (0 to 2000mg/m^3)	-0.25					<2.0%
NO (MULTOR) – (0 to 2500mg/m^3)		-0.88				<2.0%
NO (DEFOR) – (0 to 1000mg/m^3)	0.48					<2.0%
NO (DEFOR) – (0 to 2000mg/m^3)		-0.65				<2.0%
NO_2 (DEFOR) – (0 to 500mg/m^3)	0.34					<2.0%
SO_2 (UNOR) – (0 to 287mg/m^3)		-0.98				<2.0%
SO_2 (UNOR) – (0 to 2000mg/m^3)	0.47					<2.0%
SO_2 (MULTOR) – (0 to 2000mg/m^3)		0.85				<2.0%
SO_2 (DEFOR) – (0 to 287mg/m^3)		-0.98				<2.0%
SO_2 (DEFOR) – (0 to 2000mg/m^3)	0.50					<2.0%
CH_4 (UNOR) – (0 to 500mg/m^3)	-0.48					<2.0%
CH_4 (MULTOR) – (0 to 500mg/m^3)		-0.70				<2.0%
N_2O (UNOR) – (0 to 500mg/m^3)	0.40					<2.0%
Supplementary test 1 (NOx convertor):						
NO_x (UNOR)		-0.60				<2.0%
CO (UNOR)		0.93				<2.0%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Supplementary test 2 (Cooler CSS-V2SK*)*						
NO (DEFOR)		0.80				<2.0%
NO_2 (DEFOR)		0.60				<2.0%
SO_2 (UNOR)		-1.00				<2.0%
SO_2 (DEFOR)		0.60				<2.0%
CH_4 (UNOR)	0.40					<2.0%
CH_4 (MULTOR)		0.80				<2.0%
CO_2 (MULTOR)		0.90				<2.0%
O_2 (OXOR-E)	0.09					<0.2%
Influence of ambient temperature zero and reference point						
CO (UNOR)			2.00			<5.0%
CO (MULTOR)				2.40		<5.0%
NO (UNOR)			2.00			<5.0%
NO (MULTOR)			1.90			<5.0%
NO (DEFOR)		0.60				<5.0%
NO_2 (DEFOR)			1.80			<5.0%
SO_2 (UNOR)				2.50		<5.0%
SO_2 (MULTOR)				-2.30		<5.0%
SO_2 (DEFOR)				2.40		<5.0%
CH_4 (UNOR)			1.60			<5.0%
CH_4 (MULTOR)			-1.90			<5.0%
N_2O (UNOR)			-1.60			<5.0%
CO_2 (UNOR)				-2.40		<5.0%
CO_2 (MULTOR)		-0.80				<5.0%
O_2 (OXOR-P)	0.20					<0.5%
O_2 (OXOR-E)	0.24					<0.5%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Influence of sample gas pressure					N/A	*Test not applicable to extractive systems*
Influence of sample gas flow for extractive CEMS						
CO (UNOR)	0.30					<2.0%
CO (MULTOR)	0.11					<2.0%
NO (UNOR)	0.20					<2.0%
NO (MULTOR)	0.19					<2.0%
NO (DEFOR)		0.60				<2.0%
NO_2 (DEFOR)	0.40					<2.0%
SO_2 (UNOR)	0.40					<2.0%
SO_2 (MULTOR)	-0.28					<2.0%
SO_2 (DEFOR)	0.10					<2.0%
CH_4 (UNOR)		0.80				<2.0%
CH_4 (MULTOR)	0.30					<2.0%
N_2O (UNOR)	0.18					<2.0%
CO_2 (UNOR)	0.12					<2.0%
CO_2 (MULTOR)	0.10					<2.0%
O_2 (OXOR-P)	0.04					<0.2%
O_2 (OXOR-E)	0.05					<0.2%
Influence of voltage variations 190 to 250V					No influence No influence	<2.0% all gases <0.2% O_2
Influence of vibration (10 to 60Hz (±0.3mm), 60 to 150Hz at 19.6m/s^2)					N/A	*Test not applicable to extractive systems*

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Cross-sensitivity at zero with interferents: O_2, H_2O, CO, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl						
CO (UNOR)				2.40		<4.0%
CO (MULTOR)		0.57				<4.0%
NO (UNOR)			1.56			<4.0%
NO (MULTOR)				3.58		<4.0%
NO (DEFOR)				3.72		<4.0%
NO_2 (DEFOR)				2.46		<4.0%
SO_2 (UNOR)				3.66		<4.0%
SO_2 (MULTOR)				3.85		<4.0%
SO_2 (DEFOR)			-1.08			<4.0%
CH_4 (UNOR)				-3.54		<4.0%
CH_4 (MULTOR)	<0.5				Note 2	<4.0%
N_2O (UNOR)				-2.82		<4.0%
CO_2 (UNOR)			-1.88			<4.0%
CO_2 (MULTOR)	<0.5				Note 2	<4.0%
O_2 (OXOR-P)	<0.33				Note 2	<0.40%
O_2 (OXOR-E)	<0.33				Note 2	<0.40%
Supplementary test 1 (NOx convertor):					Note 3	
Interferent: NH_3						
NO_x (UNOR)	<0.5				Note 2	<4.0%
CO (UNOR)	<0.5				Note 2	<4.0%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Supplementary test 2 (Cooler CSS-V2SK)					Note 5	
Interferent: H_2O						
NO (DEFOR)	<0.5				Note 2	<4.0%
NO_2 (DEFOR)	<0.5				Note 2	<4.0%
SO_2 (UNOR)	<0.5				Note 2	<4.0%
SO_2 (DEFOR)	<0.5				Note 2	<4.0%
CH_4 (UNOR)	<0.5				Note 2	<4.0%
CH_4 (MULTOR)	<0.5				Note 2	<4.0%
CO_2 (MULTOR)	<0.5				Note 2	<4.0%
O_2 (OXOR-E)	<0.5				Note 2	<0.40%
Cross-sensitivity at reference with interferents: O_2, H_2O, CO, CO_2, CH_4, N_2O, NO, NO_2, NH_3, SO_2, HCl						
CO (UNOR)			1.43			<4.0%
CO (MULTOR)				3.38		<4.0%
NO (UNOR)				2.46		<4.0%
NO (MULTOR)			1.66			<4.0%
NO (DEFOR)				-3.40		<4.0%
NO_2 (DEFOR)				3.86		<4.0%
SO_2 (UNOR)				3.06		<4.0%
SO_2 (MULTOR)				3.81		<4.0%
SO_2 (DEFOR)				-3.88		<4.0%
CH_4 (UNOR)			-1.26			<4.0%
CH_4 (MULTOR)		-0.52				<4.0%
N_2O (UNOR)				-2.38		<4.0%
CO_2 (UNOR)				-0.48		<4.0%
CO_2 (MULTOR)	0.40					<4.0%
O_2 (OXOR-P)	0.33					<0.40%
O_2 (OXOR-E)	0.33					<0.40%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Supplementary test 1 (NOx convertor):					Note 3	
Interferent: NH_3						
NO_x (UNOR)	<0.5				Note 2	<4.0%
CO (UNOR)	<0.5				Note 2	<4.0%
Supplementary test 2 (Cooler CSS-V2SK)					Note 5	
Interferent: H_2O						
NO (DEFOR)	<0.5				Note 2	<4.0%
NO_2 (DEFOR)	<0.5				Note 2	<4.0%
SO_2 (UNOR)	<0.5				Note 2	<4.0%
SO_2 (DEFOR)	<0.5				Note 2	<4.0%
CH_4 (UNOR)	<0.5				Note 2	<4.0%
CH_4 (MULTOR)	<0.5				Note 2	<4.0%
CO_2 (MULTOR)	<0.5				Note 2	<4.0%
O_2 (OXOR-E)	<0.33					<0.40%
Converter Efficiency					95.7% Note 4	>95%

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Measurement uncertainty						
CO (UNOR)					7.37%	7.5%
CO (MULTOR)					7.50%	7.5%
NO (UNOR)					11.71%	15%
NO (MULTOR)					11.90%	15%
NO (DEFOR)					11.06%	15%
NO_2 (DEFOR)					6.99%	15%
SO_2 (UNOR)					11.52%	15%
SO_2 (MULTOR)					10.73%	15%
SO_2 (DEFOR)					10.95%	15%
CH_4 (UNOR)					15.80%	22.5%
CH_4 (MULTOR)					10.36%	22.5%
N_2O (UNOR)					5.71%	15%
CO_2 (UNOR)					5.20%	7.5%
CO_2 (MULTOR)					4.72%	7.5%
O_2 (OXOR-P)					2.36%	7.5%
O_2 (OXOR-E)					2.92%	7.5%
Field Trial						
Calibration function (field)						
CO (UNOR)					0.9003-0.9961	>0.90
CO (MULTOR)					0.9155-0.9945	>0.90
NO (UNOR)					0.9867-0.9990	>0.90
NO (MULTOR)					0.9568-0.9944	>0.90
NO (DEFOR)					0.9848-0.9983	>0.90
NO_2 (DEFOR)					0.9405-0.9969	>0.90
SO_2 (UNOR)					0.9621-0.9707	>0.90
SO_2 (MULTOR)					0.9549-0.9652	>0.90
SO_2 (DEFOR)					0.9453-0.9626	>0.90
CH_4 (UNOR)					0.9960-0.9999	>0.90

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CH_4 (MULTOR)					0.9958-0.9998	>0.90
N_2O (UNOR)					0.9886-0.9995	>0.90
CO_2 (UNOR)					0.9846-0.9964	>0.90
CO_2 (MULTOR)					0.9467-0.9919	>0.90
O_2 (OXOR-P)					0.9764-0.9880	>0.90
O_2 (OXOR-E)					0.9019-0.9861	>0.90
Supplementary test 1 (NOx convertor):						
NOx (UNOR)					0.9940-0.9946	>0.90
Response time (field)					Maximum response time recorded was for SO_2 0-250 mg/m^3 T_{90} = 187 secs	<200s
Lack of fit (field)					Relative residuals do not exceed 2.0% (or 0.2% for O_2) of the certification range.	<2.0% <0.20% (O_2)
Maintenance interval					Note 1	>8 days

Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
Change in zero point over maintenance interval						
CO (UNOR)		0.80				<3.0%
CO (MULTOR)		0.80				<3.0%
NO (UNOR)				-2.10		<3.0%
NO (MULTOR)			1.90			<3.0%
NO (DEFOR)			1.30			<3.0%
NO_2 (DEFOR)				-2.40		<3.0%
SO_2 (UNOR)				-2.80		<3.0%
SO_2 (MULTOR)			1.50			<3.0%
SO_2 (DEFOR)			-1.40			<3.0%
CH_4 (UNOR)			1.80			<3.0%
CH_4 (MULTOR)	0.70					<3.0%
N_2O (UNOR)			-1.10			<3.0%
CO_2 (UNOR)			-1.30			<3.0%
CO_2 (MULTOR)			-1.30			<3.0%
O_2 (OXOR-P)	-0.17					<0.20%
O_2 (OXOR-E)	-0.19					<0.20%
Change in reference point over maintenance interval						
CO (UNOR)			2.00			<3.0%
CO (MULTOR)				-2.60		<3.0%
NO (UNOR)				-2.40		<3.0%
NO (MULTOR)				2.90		<3.0%
NO (DEFOR)				2.40		<3.0%
NO_2 (DEFOR)				2.70		<3.0%
SO_2 (UNOR)			2.00			<3.0%
SO_2 (MULTOR)				-2.60		<3.0%
SO_2 (DEFOR)				-2.50		<3.0%
CH_4 (UNOR)				2.20		<3.0%

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Test	Results expressed as % of the certification range				Other results	MCERTS specification
	<0.5	<1	<2	<5		
CH_4 (MULTOR)			-1.80			<3.0%
N_2O (UNOR)				2.70		<3.0%
CO_2 (UNOR)				2.40		<3.0%
CO_2 (MULTOR)				2.60		<3.0%
O_2 (OXOR-P)	0.19					<0.20%
O_2 (OXOR-E)	0.16					<0.20%
Availability					At least 98.9%	>95% (>98% for O_2)
Reproducibility						
CO (UNOR)			2.00			<3.3%
CO (MULTOR)			1.60			<3.3%
NO (UNOR)				2.30		<3.3%
NO (MULTOR)			1.80			<3.3%
NO (DEFOR)				2.90		<3.3%
NO_2 (DEFOR)		1.00				<3.3%
SO_2 (UNOR)				3.20		<3.3%
SO_2 (MULTOR)			1.20			<3.3%
SO_2 (DEFOR)				3.20		<3.3%
CH_4 (UNOR)			1.90			<3.3%
CH_4 (MULTOR)	0.20					<3.3%
N_2O (UNOR)			1.60			<3.3%
CO_2 (UNOR)			1.20			<3.3%
CO_2 (MULTOR)			1.30			<3.3%
O_2 (OXOR-P)	0.20					<0.20%
O_2 (OXOR-E)	0.20					<0.20%
Supplementary test 1 (NOx convertor):					Note 3	
NOx (UNOR)			1.80			<3.3%

Note 1 - CH_4 has a maintenance interval of 3 months, CO, NO, NO_2 and N_2O have maintenance intervals of 4 weeks. SO_2, CO_2 and O_2 have maintenance intervals of 2 weeks.

Automatic calibration of zero point shall be carried out at least once a week for all components besides O2 (OXOR-P und OXOR-E) by using humidified ambient air. This procedure can be done automatically, controlled by the analyzer.

Automatic calibration of the reference point for all components shall be carried out weekly. Span gas or the calibration unit should be used for all components except oxygen. Span gas or humidified ambient air should be used to calibrate the oxygen channel (OXOR-P and OXOR-E).

Note 2 - <0.5% of test gas concentration.

Note 3 - After the field trial the system was modified by the manufacturer. A NO_x converter was added to the modular measuring system. The modification was estimated as a Type 2 change of a suitably tested measuring system in accordance with EN 15267-3 which would invalidate the certification without additional tests. Therefore, the following supplementary tests were carried out:

- Linearity tests for the modules CO (UNOR), NO (UNOR)
- Response times for the modules CO (UNOR), NO (UNOR)
- 3 month field trial
- Monthly check of the converter efficiency
- AST inclusive comparison measurements with the SRM.

Note 4 - No continuous decrease of convertor efficiency was observed.

Note 5 - The measuring system may be operated with cooler type MAK10-2 by AGT Thermotechnik (original testing done on this model) as well as with cooler type CSS-V2SK by company M&C (Supplementary tests 2).

Description

The MAC GMS800 measuring system is a modular, multiple-component measuring system for continuous monitoring of flue gases. The sample gas is taken from the gas duct with the help of a sampling probe for gas and led to the measuring system via a heated sample gas tube.
Subsequent analysis of the gas concentrations is carried out by gas analysing modules which can be individually adapted to the purposed application.

The tested measuring system comprised the following analyser modules:

- UNOR (CO, NO, SO_2, CH_4, N_2O and CO_2),
- MULTOR (CO, NO, SO_2, CH_4 and CO_2),
- DEFOR (NO, NO_2 and SO_2),
- OXOR-P (O_2)
- OXOR-E (O_2).

Additional measuring ranges:

Component	Module	Certification Range	Additional Ranges 1	2	Unit
CO	MAC GMS800 UNOR for CO	**0 - 75**	0-750	0-3000	mg/m³
CO	MAC GMS800 MULTOR for CO	**0-200**	0-2000	---	mg/m³
NO	MAC GMS800 UNOR for NO	**0-100**	0-1000	0-2000	mg/m³
NO	MAC GMS800 MULTOR for NO	**0-250**	0-2500	---	mg/m³
NO	MAC GMS800 DEFOR for NO	**0-50**	0-1000	0-2000	mg/m³
NO_2	MAC GMS800 DEFOR for NO_2	**0-50**	0-500	---	mg/m³
NO_x	MAC GMS800 UNOR for NO_x	**0-100**	0-1000	0-2000	mg/m³
SO_2	MAC GMS800 UNOR for SO_2	**0-75**	0-287	0-2000	mg/m³
SO_2	MAC GMS800 MULTOR for SO_2	**0-250**	0-2000	---	mg/m³
SO_2	MAC GMS800 DEFOR for SO_2	**0-75**	0-287	0-2000	mg/m³
CH_4	MAC GMS800 UNOR for CH_4	**0-50**	0-500	---	mg/m³
CH_4	MAC GMS800 MULTOR for CH_4	**0-286**	0-500	---	mg/m³
N_2O	MAC GMS800 UNOR for N_2O	**0-50**	0-500	---	mg/m³
CO_2	MAC GMS800 UNOR for CO_2	**0-25**	---	---	Vol.-%
CO_2	MAC GMS800 MULTOR for CO_2	**0-25**	---	---	Vol.-%
O_2	MAC GMS800 OXOR-P for O_2	**0-25**	---	---	Vol.-%
O_2	MAC GMS800 OXOR-E for O_2	**0-25**	---	---	Vol.-%

General Notes

1. This certificate is based upon the equipment tested. The Manufacturer is responsible for ensuring that on-going production complies with the standard(s) and performance criteria defined in this Certificate. The Manufacturer is required to maintain an approved quality management system controlling the manufacture of the certified product. Both the product and the quality management system shall be subject to regular surveillance according to 'Regulations Applicable to the Holders of Sira Certificates'. The design of the product certified is defined in the Sira Design Schedule V00 for certificate No. Sira MC100182/04

2. If certified product is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.

3. The Certification Marks that can be applied to the product or used in publicity material are defined in 'Regulations Applicable to the Holders of Sira Certificates'.

4. This document remains the property of Sira and shall be returned when requested by the company.