

ZERTIFIKAT

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Energiesysteme GmbH
TÜV Rheinland Group

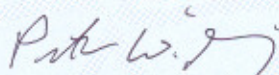
Manufacturer: Emerson Process Management GmbH &
Co. OHG

Emission Measuring System: **CLD of NGA 2000 Series**

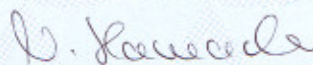
Test Report: 936/806017/C from 08.02.1999

fulfills the requirements of the QAL 1
for the component:
nitrogen dioxide and nitrogen monoxide
according to EN 14181 und EN ISO 14956

Cologne, 13.10.2005



Dr. Peter Wilbring



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DIN EN ISO 14956 and prEN 15267-3 calculation for QAL 1 in DIN EN 14181
Manufacturer data

Manufacturer	Emerson Process Management GmbH & Co. OHG
Measurement System	Multi component measurement system
Name	CLD of NGA 2000 Series
Serial Number	L9409509 and 9409510
Measuring Principle	Chemiluminescence

TÜV Data

TÜV Report	936/806017/C
Date	11.10.2005
Editor	Fr. Hamacher

Measurement Component

 NO and NO₂ 200 mg/m³
Evaluation of the cross sensitivity (CS)

	CS	X _{max, j}
to 3 Vol.-% Oxygen	0,00	mg/m ³
to 21 Vol.-% Oxygen	0,00	mg/m ³
to 30 Vol.-% Humidity	1,60	mg/m ³
to 300 mg/m ³ Carbon monoxide	0,00	mg/m ³
to 15 Vol.-% Carbon dioxide	0,00	mg/m ³
to 50 mg/m ³ Methane	-1,80	mg/m ³
to 20 mg/m ³ Dinitrogen monoxide	0,00	mg/m ³
to 20 mg/m ³ Ammonia	0,00	mg/m ³
to 200 mg/m ³ Sulphur dioxide	0,00	mg/m ³
to 1000 mg/m ³ Sulphur dioxide	0,00	mg/m ³
to 50 mg/m ³ Hydrogen chloride	0,00	mg/m ³

Sum of positive cross sensitivities	1,60	mg/m ³
Sum of negative cross sensitivities	-1,80	mg/m ³

Calculation of the combined standard uncertainty

Test Value		$\Delta X_{max, j}$	$u(\Delta X_{max, j}) = \frac{\Delta X}{\sqrt{3}}$	$u(\Delta X_{max, j})^2$
Lack of fit	u_L	2,00 mg/m ³	1,15 mg/m ³	1,333
Biggest interference (positiv or negativ)	u_I	-1,80 mg/m ³	-1,04 mg/m ³	1,080
Span shift in the field test	$u_{d,s}$	0,40 mg/m ³	0,23 mg/m ³	0,053
Zero shift in the field test	$u_{d,z}$	0,40 mg/m ³	0,23 mg/m ³	0,053
Sensitivity to sample volume flow	u_v	0,00 mg/m ³	0,00 mg/m ³	0,000
Sensitivity to sample pressure	u_{sp}	0,00 mg/m ³	0,00 mg/m ³	0,000
Sensitivity to sample temperature	u_{st}	0,00 mg/m ³	0,00 mg/m ³	0,000
Sensitivity to ambient temperature	u_t	-4,60 mg/m ³	-2,66 mg/m ³	7,053
Dependence on supply voltage	u_{sv}	0,00 mg/m ³	0,00 mg/m ³	0,000
Repeatability at span	u_s	0,00 mg/m ³	0,00 mg/m ³	0,000
Field reproducibility	u_D	1,23 mg/m ³	0,71 mg/m ³	0,504
Uncertainty of the test gas at the reference point	u_{tg}	4,00 mg/m ³	2,31 mg/m ³	5,333
NOx converter efficiency adjustment	u_{NOx}	4,00 mg/m ³	2,31 mg/m ³	5,333
Combined standard uncertainty (u_c)	u_c		$u_c = \sqrt{\sum(u_{max, j})^2}$	4,555
Total expanded uncertainty	$(u_c \cdot k)$		$U_c = u_c \cdot 1,96$	8,927
Relative total expanded uncertainty			Uc in % of the limit 135 mg/m ³	6,6
Requirement			Uc in % of the limit 135 mg/m ³	20,0

Result: Requirements keep to QAL 1 of EN 14181