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Federal Institute of Metrology METAS

Services of the Gas Analysis Laboratory: Analysis and calibration

Possibilities for immission gases

Material measure	Measurand	Measurement range	Measurement uncertainty U(Min.)	U(Max.)	With CMC* entry	Remarks
Ozone	Substance amount fraction	1 nmol/mol … 1000 nmol/mol	Q[1.1, 0.022 · x(O3)] nmol/mol		Yes	
NO_2 gas mixture	Substance amount fraction	10 µmol/mol … 100 µmol/mol	0.2 µmol/mol	Yes	Ja	
NO_2 gas mixture	Substance amount fraction	20 nmol/mol … 1000 nmol/mol	2 %			
NH_3 gas mixture	Substance amount fraction	30 µmol/mol … 100 µmol/mol	0.9 µmol/mol	Yes	Ja	
NH_3 gas mixture	Substance amount fraction	20 nmol/mol … 1000 nmol/mol	2 %	5 %		
Gas mixture with Benzene, Toluene, Ethylbenzene, m-Xylene, o-Xylene	Substance amount fraction	2 nmol/mol … 1000 nmol/mol	1 %	5 %		Binary or multicomponent mixture
NO_x measurement device	Substance amount fraction of NO and NO_2	20 nmol/mol … 1000 nmol/mol	NO: 1.5 % NO_2: 2 %	NO: 2.5 % NO_2: 3 %		
NH_3 measurement device	Substance amount fraction	20 nmol/mol … 1000 nmol/mol	2 %	3 %		
BTEX measurement device	Substance amount fraction of Benzene, Toluene, Xylene, Ethylbenzene	2 nmol/mol … 100 nmol/mol	1 %	5 %		Binary or multicomponent mixture
SO_2 measurement device	Substance amount fraction	20 nmol/mol … 1000 nmol/mol	2 %	3 %		
Permeation unit with NO_2, NH_3, SO_2, Benzene, Toluene, Ethylbenzene, m-Xylene, o-Xylene	Mass flow through the membrane	30 ng/min … 10000 ng/min	0.5 %	5 %		Also other volatile substances

*CMC = Calibration and Measurement Capabilities

Etalonnage d'instruments de mesure et de mélange de gaz pour d'autres analyte comme par ex. CO, H_2O, SO_2, H_2S, Formaldéhyde, N_2O, SF_6 sur demande

Measurements possibilities for gas mixtures

Analyte	Carrier gas	Substance amount fraction (Standard)	Measurement uncertainty U(Min.)	U(Max.)	With CMC* entry
CO	N_2	1 µmol·mol^{-1} ... 200 µmol·mol^{-1}	0.6 %	1 %	Yes
	N_2	1 mmol·mol^{-1} ... 50 mmol·mol^{-1}	0.4 %	0.4 %	Yes
CO_2	N_2	10 mmol·mol^{-1} ... 200 mmol·mol^{-1}	0.35 %	0.35 %	Yes
C_3H_8	N_2	100 µmol·mol^{-1} ... 500 µmol·mol^{-1}	0.8 %	0.8 %	Yes
	N_2	500 µmol·mol^{-1} ... 4000 µmol·mol^{-1}	0.8 %	0.8 %	Yes
NO	N_2	20 µmol·mol^{-1} ... 150 µmol·mol^{-1}	1 %	1 %	Yes
O_2	N_2	25 mmol·mol^{-1} ... 250 mmol·mol^{-1}	0.4 %	0.4 %	Yes
Breath alcohol	Humidified air	50 µg/L … 2000 µg/L	1.5 %	3 %	

Measurements possibilities for small gas flows

	Primary standard	With CMC* entry	Secondary standard
Measurand	Volumic flow q_V		Volumic flow q_V
Measurement range	3 cm^3 • min^{-1} … 30 000 cm^3 • min^{-1}	Yes	1 cm^3 • min^{-1} … 10 000 cm^3 • min^{-1}
Extended measurement uncertainty	0.4 % … 0.1 %	Yes	1 % … 0.2 %
Measurement conditions — **Fluid**	Inert gas except H_2 and He, No reaction with mercury		Inert gas except H_2 and He
Inlet pressure before test object			100 kPa … 450 kPa
Outlet pressure after test object	92.5 kPa … 97.5 kPa		
Gas temperature	293.05 K … 293.25 K		283.15 K … 303.15 K

The volumic flow q_v is normally referenced to 273.15 K and 101.325 kPa (standard conditions).

Type approval and conformity evaluation

- **Exhaust gas measuring instrument for combustion plants:**
  On the basis of the ordinance of the FDJP on the exhaust gas measuring instrument for combustion plants (941.210.3) and the EN 50379
- **Breath alcohol analyser, breath testers**
  On the basis if the ordinance of the FDJP on the breath alcohol analyser (941.210.4) and the OIML R126 and the EN15964
- **Ozone emission**
  Air cleaner : Assessment according to IEC 60335-2-65

Verification

For the official controls
- exhaust gas measuring instrument for combustion plants for the combustible substance; fuel oil extra light, natural gas et and wood
- Breath alcohol analyser
- Breath analyser (if necessary also adjustment)

Various

- Production of ethanol reference solution

For other information, please contact:

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