Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS CALIBRATION **0590** **Accredited to ISO/IEC 17025:2017**	**EffecTech Limited** **Issue No:** 059 **Issue date:** 16 January 2025	
	Dove House **Dove Fields** **Uttoxeter** **Staffordshire** **ST14 8HU**	**Contact: Steve Price** **Tel: +44 (0)1889 569229** **E-Mail: steve.price@effectech.co.uk** **Website: www.effectech.co.uk**

Calibration performed by the Organisations at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address Dove House Dove Fields Uttoxeter Staffordshire ST14 8HU	**Local contact** Steve Price Tel: +44 (0)1889 569229 email: steve.price@effectech.co.uk	Gas Calibration Process Gas Analysers Liquefied Natural Gas (LNG) Analysers	Uttoxeter

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Customers' sites or premises The customers' site or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between the laboratory and the customer.	Process Gas Analysers	Customers' sites

CALIBRATION AND MEASUREMENT CAPABILITY

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRIMARY REFERENCE GAS MIXTURES (PRGM) Calibration of synthetic gas mixtures by high-precision gravimetry in accordance with ISO 6142-1:2015 (Class I mixtures individually verified by analysis)				Uttoxetrer
SYNTHETIC NATURAL GAS MIXTURES	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM016/UT**	
nitrogen	0.02 to 25	0.12 % relative + 0.00034	Method in accordance with ISO 6142-1:2015 “Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures” using high precision gravimetry	
carbon dioxide	0.05 to 25	0.10 % relative + 0.00006		
methane	34 to 100	0.055 - 0.05 % relative		
ethane	0.1 to 35	0.12 % relative + 0.00026		
propane	0.05 to 20	0.15 % relative + 0.00002		
iso-butane	0.01 to 2	0.15 % relative + 0.00011		
n-butane	0.01 to 2	0.15 % relative + 0.00011		
neo-pentane	0.001 to 0.5	0.35 % relative + 0.00005		
iso-pentane	0.002 to 0.6	0.25 % relative + 0.00005		
n-pentane	0.002 to 0.6	0.25 % relative + 0.00005		
n-hexane	0.001 to 0.5	0.50 % relative + 0.00005		
2-methylpentane	0.001 to 0.35	0.65 % relative + 0.00003		
3-methylpentane	0.001 to 0.35	0.65 % relative + 0.00003		
2,2-dimethylbutane	0.001 to 0.35	0.65 % relative + 0.00003		
benzene	0.001 to 0.2	0.65 % relative + 0.00003		
cyclohexane	0.001 to 0.2	0.65 % relative + 0.00003		
n-heptane	0.001 to 0.2	0.65 % relative + 0.00003		
toluene	0.001 to 0.1	0.65 % relative + 0.00003		
methylcyclohexane	0.001 to 0.1	0.65 % relative + 0.00003		
n-octane	0.0005 to 0.05	0.65 % relative + 0.00003		
n-nonane	0.0001 to 0.02	0.65 % relative + 0.00003		
n-decane	0.0001 to 0.005	0.65 % relative + 0.00003		
helium	0.005 to 0.2	0.85 % relative + 0.00022		
hydrogen	0.005 to 0.2	0.80 % relative + 0.0002		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRIMARY REFERENCE GAS MIXTURES (PRGM) (continued)				Uttoxeter
SYNTHETIC FUEL GAS MIXTURES	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM016/UT**	
nitrogen	0.1 to 60	0.12 % relative + 0.00033	Method in accordance with ISO 6142-1:2015 “Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures” using high precision gravimetry	
carbon dioxide	0.1 to 30	0.35 % relative		
hydrogen	1 to 40 40 to 70	0.15 % relative + 0.015 0.075		
carbon monoxide	0.1 to 30	0.13 % relative + 0.0038		
methane	1 to 70	0.04		
ethane	0.5 to 28	0.13 % relative + 0.005		
ethene	0.5 to 12	0.6 % relative + 0.0025		
propane	0.1 to 1 1 to 15	0.01 0.2 % relative + 0.0065		
propene	0.1 to 5	0.25 % relative + 0.001		
SULPHUR GAS MIXTURES	amount fraction (µmol/mol)	amount fraction (µmol/mol)	**In-house method TM016/UT** matrix gas : methane or nitrogen	
hydrogen sulphide	0.2 to 2 2 to 200	0.03 1 % relative + 0.01	Method in accordance with ISO 6142-1:2015 “Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures” using high precision gravimetry	
carbonyl sulphide	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
methanethiol (methyl mercaptan)	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
ethanethiol (ethyl mercaptan)	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
dimethyl sulphide	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
2-propanethiol (iso-propyl mercaptan)	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
ethyl methyl sulphide (methyl ethyl sulphide)	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
2-methyl-2-propanethiol (tert-butyl mercaptan)	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRIMARY REFERENCE GAS MIXTURES (PRGM) (continued)				**Uttoxeter**
SULPHUR GAS MIXTURES (continued)	amount fraction (µmol/mol)	amount fraction (µmol/mol)	**In-house method TM016/UT** matrix gas : methane or nitrogen (continued)	
diethyl sulphide	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
tetrahydrothiophene (THT)	0.2 to 2 2 to 200	0.03 1 % relative + 0.01		
BINARY GAS MIXTURES	amount fraction (µmol/mol or % mol/mol)	amount fraction (µmol/mol)	**In-house method TM016/UT**	
carbon monoxide/nitrogen	10 to 100 100 to 1000	0.13 % relative + 0.3 0.40 % relative	Method in accordance with ISO 6142-1:2015 “Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures” using high precision gravimetry	
carbon dioxide/nitrogen	0.1 % to 5 % 5 % to 15 %	0.25 % relative + 7.5 0.10 % relative + 85		
oxygen/nitrogen	10 to 100 100 to 1000 0.1 % to 1.0 % 1.0 % to 22.5 %	0.80 % relative + 0.1 0.45 % relative + 0.25 0.35 % relative + 0.5 0.10 % relative + 15		
nitric oxide/nitrogen	10 to 60 60 to 600	0.10 % relative + 0.13 0.20 % relative + 0.07		
nitrogen dioxide/synthetic air	5 to 500	2.0 % relative		
sulphur dioxide/nitrogen	10 to 200 200 to 1000	0.10 % relative + 0.5 0.30 % relative + 0.1		
methane/nitrogen	0.1 % to 2 % 2 % to 5 %	0.18 % relative + 5 0.10 % relative + 25		
methane/synthetic air	0.1% to 2 % 2 % to 2.5 %	0.18 % relative + 5 0.10 % relative + 25		
propane/nitrogen	1 to 1000 0.1 % to 2 %	0.40 % relative + 0.05 0.14 % relative + 2.6		
propane/synthetic air	1 to 1000 0.1 % to 1.1 %	0.40 % relative + 0.05 0.14 % relative + 2.6		
PROPANE BALANCE GAS MIXTURES	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM016/UT**	
nitrogen	0.1 to 3	0.2 % relative + 0.006	Method in accordance with ISO 6142-1:2015 “Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures” using high precision gravimetry	
ethane	0.25 to 3	0.4 % relative + 0.001		
propane	92 to 99.5	0.21 - 0.20 % relative		
iso-butane	0.03 to 1	0.4 % relative + 0.0005		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
PRIMARY REFERENCE GAS MIXTURES (PRGM) (continued)				Uttoxeter
PROPANE BALANCE GAS MIXTURES (continued)	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM016/UT** (continued)	
n-butane	0.03 to 1	0.4 % relative +0.0005		
iso-pentane	0.02 to 0.08	0.9 % relative		
n-pentane	0.02 to 0.08	0.9 % relative		
CALIBRATED GAS MIXTURES (CGM) Calibration of synthetic gas mixtures by analysis				
SYNTHETIC NATURAL GAS, BIOMETHANE and FUEL GAS MIXTURES	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM001/UT**	
nitrogen	0.1 to 22	0.25 % relative + 0.001	Calibration of gas mixtures by ISO 6143:2001 using gas chromatography with thermal conductivity detection (GC-TCD)	
carbon dioxide	0.05 to 15	0.22 % relative + 0.0006		
methane	34 to 100	0.12% - 0.11% relative		
ethane	0.1 to 35	0.25 % relative + 0.0012		
propane	0.05 to 15	0.3 % relative + 0.0005		
iso-butane	0.01 to 2	0.25 % relative + 0.0001		
n-butane	0.01 to 2	0.25 % relative + 0.0002		
neo-pentane	0.002 to 0.35	0.7 % relative + 0.0001		
iso-pentane	0.005 to 0.35	0.4 % relative + 0.0001		
n-pentane	0.005 to 0.35	0.4 % relative + 0.0002		
n-hexane	0.001 to 0.35	1.0 % relative + 0.0001	Calibration of gas mixtures using gas chromatography with flame ionisation detection (GC-FID)	
2-methylpentane	0.001 to 0.35	1.3 % relative + 0.00005		
3-methylpentane	0.001 to 0.35	1.3 % relative + 0.00005		
2,2-dimethylbutane	0.001 to 0.35	1.3 % relative + 0.00005		
benzene	0.001 to 0.2	1.3 % relative + 0.00005		
cyclohexane	0.001 to 0.2	1.3 % relative + 0.00005		
n-heptane	0.001 to 0.2	1.3 % relative + 0.00005		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CALIBRATED GAS MIXTURES (CGM) (continued)				
SYNTHETIC NATURAL GAS, BIOMETHANE and FUEL GAS MIXTURES (continued)	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM001/UT** (continued)	
toluene	0.001 to 0.1	1.3 % relative + 0.00005		
methylcyclohexane	0.001 to 0.1	1.3 % relative + 0.00005		
n-octane	0.0005 to 0.05	1.3 % relative + 0.00005		
n-nonane	0.0005 to 0.02	1.3 % relative + 0.00005		
n-decane	0.0005 to 0.005	1.3 % relative + 0.00005		
C_6+	0.001 to 0.35	1.0 % relative + 0.0001	C_6+ is the sum of all hydrocarbons containing six carbon atoms or greater	
helium	0.005 to 0.2	1.7 % relative + 0.0004	Calibration of gas mixtures using gas chromatography with thermal conductivity detection (GC-TCD)	
hydrogen	0.05 to 20	0.22 % relative + 0.002		
oxygen	0.05 to 3	0.4 % relative + 0.003		
	amount fraction (µmol/mol or % mol/mol)	amount fraction (µmol/mol)	**In-house method TM026/UT**	
oxygen	10 to 100 100 to 1000 0.1 % to 1.0 % 1.0 % to 22.5 % [1]	1.6 % relative + 0.1 0.9 % relative + 0.5 0.7 % relative + 1.0 0.18 % relative + 30	Calibration of oxygen in gas mixtures by ISO 12963:2017 using galvanic fuel cell sensors Note [1] - The upper limit for oxygen may be limited due to restrictions in place required for the safe manufacture of such mixtures.	**Uttoxeter**

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
GAS MIXTURE PROPERTIES Calculated values from composition				
superior calorific value molar basis (kJ.mol^{-1}) mass basis (MJ.kg^{-1}) volume basis (MJ.m^{-3})	Calculations are restricted to gas mixtures with amount fraction (% mol/mol)	 0.1 % relative 0.1 % relative 0.1 % relative	Values calculated according to **ISO 6976:1995** (including amendment No 1, May 1998) on a *real* or *ideal* gas basis assuming mixture is dry (free from water)	**Uttoxeter**
inferior calorific value molar basis (kJ.mol^{-1}) mass basis (MJ.kg^{-1}) volume basis (MJ.m^{-3})	nitrogen < 30 carbon dioxide < 15 ethane < 15 other components < 5 methane no restriction	 0.1 % relative 0.1 % relative 0.1 % relative	Combustion properties can be expressed in units of the Joule (J) or in kilowatt hours (kWh)	
relative density density (kg.m^{-3})		0.1 % relative 0.1 % relative		
superior Wobbe index (MJ.m^{-3}) inferior Wobbe index (MJ.m^{-3})		0.1 % relative 0.1 % relative		
molar mass (kg.kmol^{-1}) compression factor		0.1 % relative 0.1 % relative		
gross calorific value molar basis (kJ.mol^{-1}) mass basis (MJ.kg^{-1}) volume basis (MJ.m^{-3})	Calculations are applicable to any gaseous natural gas, natural gas substitute, or other combustible fuel, except that for properties on a volume basis, where the method is restricted only to gas mixtures for which the compression factor is greater than 0.9	 1.0 kJ.mol^{-1} 0.025 MJ.kg^{-1} 0.040 MJ.m^{-3}	Values calculated according to **ISO 6976:2016** on a *real* or *ideal* gas basis assuming mixture is dry (free from water)	
net calorific value molar basis (kJ.mol^{-1}) mass basis (MJ.kg^{-1}) volume basis (MJ.m^{-3})		 0.9 kJ.mol^{-1} 0.023 MJ.kg^{-1} 0.037 MJ.m^{-3}	Combustion properties can be expressed in units of the Joule (J) or in kilowatt hours (kWh)	
relative density density (kg.m^{-3})		0.0006 0.0008 kg.m^{-3}		
gross Wobbe index (MJ.m^{-3}) net Wobbe index (MJ.m^{-3})		0.032 MJ.m^{-3} 0.030 MJ.m^{-3}		
molar mass (kg.kmol^{-1}) compression factor		0.017 kg.kmol^{-1} 0.0001		
gross heating value net heating value relative density compressibility factor	There are no composition or property-related restrictions on the method specified	0.1 % relative 0.1 % relative 0.1 % relative 0.1 % relative	Calculated values according to methods given in **GPA 2172-19** (2019) using data tables from **GPA 2145-16**	
gross heating value net heating value relative density density compressibility factor	There are no composition or property-related restrictions on the method specified	0.1 % relative 0.1 % relative 0.1 % relative 0.1 % relative 0.1 % relative	Calculated values according to methods given in **ASTM D3588-98** (2017) using data tables from **GPA 2145-16**	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CALIBRATED GAS MIXTURES (CGM) (continued)				Uttoxeter
SULPHUR GAS MIXTURES	amount fraction (µmol/mol)	amount fraction (µmol/mol)	**In-house method TM002/UT** matrix gas : methane or nitrogen	
hydrogen sulphide	0.2 to 10	2 % relative + 0.03	Calibration of gas mixtures using gas chromatography with sulphur chemiluminescence detection (GC-SCD)	
carbonyl sulphide	0.2 to 10	2 % relative + 0.03		
methanethiol (methyl mercaptan)	0.2 to 10	2 % relative + 0.03		
ethanethiol (ethyl mercaptan)	0.2 to 10	2 % relative + 0.03		
dimethyl sulphide	0.2 to 10	2 % relative + 0.03		
1-propanethiol (n-propyl mercaptan)	0.2 to 10	4 % relative + 0.03		
2-propanethiol (iso-propyl mercaptan)	0.2 to 10	2 % relative + 0.03		
ethyl methyl sulphide (methyl ethyl sulphide)	0.2 to 10	2 % relative + 0.03		
1-butanethiol (n-butyl mercaptan)	0.2 to 10	4 % relative + 0.03		
2-methyl-2-propanethiol (tert-butyl mercaptan)	0.2 to 10	2 % relative + 0.03		
2-methyl-1-propanethiol (iso-butyl mercaptan)	0.2 to 10	4 % relative + 0.03		
1-methyl-1-propanethiol (sec-butyl mercaptan)	0.2 to 10	4 % relative + 0.03		
diethyl sulphide	0.2 to 10	2 % relative + 0.03		
n-hexyl mercaptan	0.2 to 10	4 % relative + 0.03		
tetrahydrothiophene (THT)	0.2 to 10	2 % relative + 0.03		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
CALIBRATED GAS MIXTURES (CGM) (continued)				
BINARY GAS MIXTURES	amount fraction (µmol/mol or % mol/mol)	amount fraction (µmol/mol)	**In-house method TM026/UT**	Uttoxeter
oxygen in nitrogen	10 to 100 100 to 1000 0.1 % to 1.0 % 1.0 % to 22.5 %	1.6 % relative + 0.1 0.9 % relative + 0.5 0.7 % relative + 1.0 0.18 % relative + 30	Calibration of gas mixtures by ISO 12963:2017 using galvanic fuel cell sensors	
TERTIARY EMISSION GAS MIXTURES	amount fraction (µmol/mol)	amount fraction (µmol/mol)	**In-house method TM014**	
nitric oxide	10 to 60 60 to 600	0.20 % relative + 0.25 0.40 % relative + 0.13	Calibration of gas mixtures by ISO 12963:2017 using dynamically generated reference gases in accordance with ISO 6145 Part 7 Thermal Mass Flow Controllers	
nitrogen dioxide in nitrogen	5 to 500	4.0 % relative		
BINARY EMISSION GAS MIXTURES	amount fraction (µmol/mol or %mol/mol)	amount fraction (µmol/mol)	**In-house method TM014**	
carbon monoxide in nitrogen or synthetic air	10 to 100 100 to 1000	0.25 % relative + 0.55 0.80 % relative	Calibration of gas mixtures by ISO 12963:2017 using dynamically generated reference gases in accordance with ISO 6145 Part 7 Thermal Mass Flow Controllers	
nitric oxide in nitrogen	10 to 60 60 to 600	0.20 % relative + 0.25 0.40 % relative + 0.13		
nitrogen dioxide in synthetic air	5 to 500	4.0 % relative		
sulphur dioxide in nitrogen or synthetic air	10 to 200 200 to 1000	0.17 % relative + 1.0 0.60 % relative + 0.12		
oxygen in nitrogen	0.5 % to 3 % 3 % to 25 %	0.50 % relative + 85 0.40 % relative + 100		
methane in nitrogen	0.1 % to 2 % 2 % to 5 %	0.35 % relative + 10 0.15 % relative + 50		
methane in synthetic air	0.1 % to 2.5 %	0.35 % relative + 10		
BINARY EMISSION GAS MIXTURES	amount fraction (µmol/mol or %mol/mol)	amount fraction (µmol/mol)	**In-house method TM025**	
propane in nitrogen or synthetic air	3 to 100	0.6 % relative + 0.1	Calibration of gas mixtures by ISO 12963:2017 using gas chromatography with flame ionisation detection (GC-FID)	
carbon dioxide in nitrogen or synthetic air	0.1% to 5% 5% to 15%	0.27% relative + 0.0024 0.23% relative + 0.01	Calibration of gas mixtures by ISO 12963:2017 using gas chromatography with thermal conductivity detection (GC-TCD)	Uttoxeter

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
LIQUEFIED NATURAL GAS (LNG) ANALYSERS Calibration of LNG analysers using reference liquid mixtures				
LNG ANALYSERS	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM024/UT**	Uttoxeter
nitrogen	0.1 to 1.8	0.10 % relative + 0.0065	Calibration of analysers used for direct measurement of liquefied natural gas (LNG) using cryogenically prepared reference liquid mixures	
methane	79 to 100	0.035		
ethane	0.1 to 4 4 to 14	0.30 % relative + 0.001 0.05 % relative + 0.01		
propane	0.1 to 4	0.15 % relative + 0.0015		
iso-butane	0.02 to 1.3	0.25 % relative + 0.001		
n-butane	0.02 to 1.3	0.25 % relative + 0.001		
iso-pentane	0.01 to 0.16	0.50 % relative + 0.0002		
n-pentane	0.01 to 0.16	0.50 % relative + 0.0002		
GAS ANALYSERS Calibration of gas analysers using reference gas mixtures				
NATURAL GAS ANALYSERS	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM003**	Customers' sites
nitrogen	0.1 to 22	0.25 % relative + 0.0005	Calibration of gas analysers used for natural gas analysis in accordance with ISO 10723:2012	
carbon dioxide	0.05 to 15	0.18 % relative + 0.0001		
methane	34 to 100	0.07		
ethane	0.1 to 23	0.25 % relative		
propane	0.05 to 10	0.3 % relative		
iso-butane	0.01 to 0.15 0.15 to 2	0.00045 0.3 % relative		
n-butane	0.01 to 0.15 0.15 to 2	0.00045 0.3 % relative		
neo-pentane	0.005 to 0.35	0.7 % relative + 0.0001		
iso-pentane	0.005 to 0.35	0.5 % relative + 0.0001		
n-pentane	0.005 to 0.35	0.5 % relative + 0.0001		
n-hexane	0.001 to 0.35	1.0 % relative + 0.0001		
n-heptane	0.001 to 0.20	1.3 % relative + 0.00005		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
GAS ANALYSERS Calibration of gas analysers using reference gas mixtures				
NATURAL GAS ANALYSERS (continued)	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM003**	
n-octane	0.0005 to 0.05	1.3 % relative + 0.00005	Calibration of gas analysers used for natural gas analysis in accordance with ISO 10723:2012	
n-nonane	0.0005 to 0.02	1.3 % relative + 0.00005		
n-decane	0.0005 to 0.005	1.3 % relative + 0.00005		
OTHER FUEL GAS ANALYSERS	amount fraction (% mol/mol)	amount fraction (% mol/mol)	**In-house method TM006**	
C_1 - C_3	0.0008 to 100	amount fractions from 1 % to 100 % ± 0.5 % relative	Calibration of gas analysers based on ISO 10723:2012	
C_4	0.001 to 50			
C_5	0.001 to 9	amount fractions from 0.1 % to 1 % ± 1 % relative		
C_6	0.001 to 1.5			
C_7	0.001 to 0.5	amount fractions from 0.0008 % to 0.1 % ± 2 % relative		
C_8	0.001 to 0.2			
C_9	0.001 to 0.2			
C_{10}	0.001 to 0.05			
benzene	0.001 to 1	amount fractions from 1 % to 100 % ± 0.5 % relative		
toluene	0.001 to 0.4			
xylenes (m, p and o)	0.001 to 0.1	amount fractions from 0.1 % to 1 % ± 1 % relative		
argon	0.1 to 100			
carbon dioxide	0.03 to 100	amount fractions from 0.0008 % to 0.1 % ± 2 % relative		
carbon monoxide	0.001 to 100			
helium	0.1 to 100			
hydrogen	0.08 to 100			
nitrogen	0.1 to 100			
oxygen	0.05 to 100			
				Customers' sites

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
GAS ANALYSERS Calibration of gas analysers using reference gas mixtures				**Customers' sites**
OTHER GAS ANALYSERS	amount fraction (µmol/mol)	amount fraction (µmol/mol)	**In-house method TM006**	
hydrogen sulphide	1 to 10	2 % relative + 0.03	Calibration of gas analysers based on ISO 10723:2012	
END				

Appendix - Calibration and Measurement Capabilities

Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand.
Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \times 0.01 \times q$, where q is the quantity value.

The notation Q[a, b] stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$