


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p>UKAS CALIBRATION</p> <p>0590</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p>EffecTech Limited</p> <p>Issue No: 058 Issue date: 25 September 2024</p>	
	<p>Dove House Dove Fields Uttoxeter Staffordshire ST14 8HU</p>	<p>Contact: Adam Lomax Tel: +44 (0)1889 569229 E-Mail: adam.lomax@effectech.co.uk Website: www.effectech.co.uk</p>
<p>Calibration performed by the Organisations at the locations specified below</p>		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
<p>Address Dove House Dove Fields Uttoxeter Staffordshire ST14 8HU</p> <p>Local contact Adam Lomax Tel: +44 (0)1889 569229 email: adam.lomax@effectech.co.uk</p>	<p>Gas Calibration Process Gas Analysers Liquefied Natural Gas (LNG) Analysers</p>	Uttoxeter

Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>Customers' sites or premises</p> <p>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.</p>	<p>Process Gas Analysers</p>	Customers' sites



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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)				Uttoxeter
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		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
PRIMARY REFERENCE GAS MIXTURES (PRGM) (continued)				
SYNTHETIC FUEL GAS MIXTURES				
nitrogen	amount fraction (% mol/mol) 0.1 to 60	amount fraction (% mol/mol) 0.12 % relative + 0.00033	In-house method TM016/UT 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				
hydrogen sulphide	amount fraction ($\mu\text{mol/mol}$) 0.2 to 2 2 to 200	amount fraction ($\mu\text{mol/mol}$) 0.03 1 % relative + 0.01	In-house method TM016/UT matrix gas : methane or nitrogen 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	Uftoxeter
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		



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PRIMARY REFERENCE GAS MIXTURES (PRGM) (continued)				
SULPHUR GAS MIXTURES (continued)	amount fraction ($\mu\text{mol/mol}$)	amount fraction ($\mu\text{mol/mol}$)	In-house method TM016/UT matrix gas : methane or nitrogen (continued)	Uttoxeter
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 ($\mu\text{mol/mol}$ or % mol/mol)	amount fraction ($\mu\text{mol/mol}$)	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		



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PRIMARY REFERENCE GAS MIXTURES (PRGM) (continued)				
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	Uttoxeter
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	0.11% % relative + 0.12		
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 + 0.00002		
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		



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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)	Uttoxeter
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		
oxygen	amount fraction ($\mu\text{mol/mol}$ or % mol/mol) 10 to 100 100 to 1000 0.1 % to 1.0 % 1.0 % to 22.5 % [1]	amount fraction ($\mu\text{mol/mol}$) 1.6 % relative + 0.1 0.9 % relative + 0.5 0.7 % relative + 1.0 0.18 % relative + 30	In-house method TM026/UT 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.	



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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 <i>real</i> or <i>ideal</i> gas basis assuming mixture is dry (free from water)	Uthoxeter
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 <i>real</i> or <i>ideal</i> 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	



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CALIBRATED GAS MIXTURES (CGM) (continued)				
SULPHUR GAS MIXTURES	amount fraction ($\mu\text{mol/mol}$)	amount fraction ($\mu\text{mol/mol}$)	In-house method TM002/UT matrix gas : methane or nitrogen	Uttoxeter
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		
BLAST FURNACE GAS MIXTURES	amount fraction (% mol/mol)	amount fraction (% mol/mol)	In-house method TM004/UT	
nitrogen	27 to 54	0.25 % relative	Calibration of gas mixtures by ISO 6143:2001 using gas chromatography with thermal conductivity detection (GC-TCD)	
carbon dioxide	20 to 31	0.25 % relative		
hydrogen	1 to 16	0.25 % relative +0.03		
carbon monoxide	20 to 31	0.25 % relative		



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CALIBRATED GAS MIXTURES (CGM) (continued)					
BASIC OXYGEN STEELMAKING GAS (BOS)	amount fraction (% mol/mol)	amount fraction (% mol/mol)	In-house method TM004/UT	Uttoxeter	
nitrogen	11 to 30	0.2 % relative + 0.02	Calibration of gas mixtures by ISO 6143:2001 using gas chromatography with thermal conductivity detection (GC-TCD)		
carbon dioxide	12 to 20	0.2 % relative + 0.02			
carbon monoxide	45 to 75	0.15 - 0.1 % relative			
hydrogen	0.4 to 3	0.5 % relative + 0.002			
oxygen	0.3 to 1.3	0.7 % relative + 0.0005			
BINARY EMISSION GAS MIXTURES	amount fraction ($\mu\text{mol/mol}$)	amount fraction ($\mu\text{mol/mol}$)			In-house method TM025/UT
propane in nitrogen	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)
propane in synthetic air	3 to 100	0.6 % relative + 0.1			
BINARY GAS MIXTURES	amount fraction ($\mu\text{mol/mol}$ or % mol/mol)	amount fraction ($\mu\text{mol/mol}$)	In-house method TM026/UT		
oxygen in nitrogen	10 to 100	1.6 % relative + 0.1	Calibration of gas mixtures by ISO 12963:2017 using galvanic fuel cell sensors		
	100 to 1000	0.9 % relative + 0.5			
	0.1 % to 1.0 %	0.7 % relative + 1.0			
	1.0 % to 22.5 %	0.18 % relative + 3.0			
TERTIARY EMISSION GAS MIXTURES	amount fraction ($\mu\text{mol/mol}$)	amount fraction ($\mu\text{mol/mol}$)	In-house method TM014		
nitric oxide	10 to 60	0.20 % relative + 0.25	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	60 to 600 5 to 500	0.40 % relative + 0.13 4.0 % relative			



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CALIBRATED GAS MIXTURES (CGM) (continued)				
BINARY EMISSION GAS MIXTURES	amount fraction ($\mu\text{mol/mol}$ or $\% \text{mol/mol}$)	amount fraction ($\mu\text{mol/mol}$)	In-house method TM014	Uttoxeter
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 % 2 % to 2.5 %	0.35 % relative + 10 0.15 % relative + 50		
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 mixtures	
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		



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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				
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				
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					



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

EffecTech Limited

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Calibration performed by the Organisation at the locations specified

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
GAS ANALYSERS (continued)				
OTHER FUEL GAS ANALYSERS (continued)	amount fraction (% mol/mol)	amount fraction (% mol/mol)	In-house method TM006 (continued)	Customers' sites
benzene	0.001 to 1	amount fractions from 1 % to 100 %		
toluene	0.001 to 0.4	± 0.5 % relative		
xylenes (m, p and o)	0.001 to 0.1	amount fractions from 0.1 % to 1 %		
argon	0.1 to 100	± 1 % relative		
carbon dioxide	0.03 to 100	amount fractions from 0.0008 % to 0.1 %		
carbon monoxide	0.001 to 100	± 2 % relative		
helium	0.1 to 100			
hydrogen	0.08 to 100			
nitrogen	0.1 to 100			
oxygen	0.05 to 100			
OTHER GAS ANALYSERS	amount fraction ($\mu\text{mol/mol}$)	amount fraction ($\mu\text{mol/mol}$)		
hydrogen sulphide	1 to 10	2 % relative + 0.03		
END				



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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: $Q[a, b] = [a^2 + b^2]^{1/2}$