

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p>Accredited to ISO/IEC 17025:2005</p>	EffectTech Issue No: 023 Issue date: 06 February 2009	
	Dove House Dove Fields Uttoxeter Staffordshire ST14 8HU	Contact: Dr Gavin Squire Tel: +44 (0)1889 569229 Fax: +44 (0)1889 569220 E-Mail: gavin.squire@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 Dr Gavin Squire Tel: +44 (0)1889 569229 Fax: +44 (0)1889 569220 email: gavin.squire@effectech.co.uk	Gas Calibration Process Gas Analysers	Uttoxeter
Address N-163 MIDC Tarapur Boisar District Thane - 401506 Maharashtra India Local contact Padmakar Tillu Tel: +91 (0)2525 276137 Fax: +91 (0)2525 276827 email: padmakar.tillu@effectech.co.in	Gas Calibration	Tarapur

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Any Suitable Customer Premises	Process Gas Analysers	Site



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DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	Remarks	Location Code	
GAS MIXTURES	amount fraction (%mol/mol)	amount fraction (%mol/mol)	In-house method TM001	Uttoxeter	
nitrogen	0.1 to 22	0.25 % relative + 0.0060	Calibration of gas mixtures in accordance with ISO 6143:2001 using gas chromatography with thermal conductivity detection (TCD)		
carbon dioxide	0.05 to 1.5 1.5 to 15	0.0050 0.35 % relative + 0.0010			
methane	34 to 100	0.10 % relative			
ethane	0.1 to 23	0.3 % relative + 0.0055			
propane	0.05 to 0.5 0.5 to 10	0.0025 0.3 % relative + 0.0010			
iso-butane	0.01 to 0.15 0.15 to 2.0	0.0008 0.55 % relative			
n-butane	0.01 to 0.15 0.15 to 2.0	0.0012 0.55 % relative + 0.0004			
neo-pentane	0.005 to 0.05 0.05 to 0.35	0.0009 1.4 % relative + 0.0002			
iso-pentane	0.005 to 0.10 0.10 to 0.35	0.0009 0.9 % relative			
n-pentane	0.005 to 0.10 0.10 to 0.35	0.0012 1.2 % relative			
n-hexane	0.005 to 0.10 0.10 to 0.35	0.0016 1.5 % relative + 0.0001			
2-methylpentane	0.005 to 0.10 0.10 to 0.35	0.0021 2.0 % relative + 0.0001			
C ₆ +	0.005 to 0.10 0.10 to 0.35	0.0016 1.5 % relative + 0.0001			C ₆ + is the sum of all hydrocarbons containing six carbon atoms or greater



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Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty ($k=2$)	Remarks	Location Code		
GAS MIXTURES (cont'd)	amount fraction (%mol/mol)	amount fraction (%mol/mol)	In-house method TM001	Uttoxeter		
benzene	0.005 to 0.10	1.6 % relative + 0.0001	Calibration of gas mixtures using gas chromatography with flame ionisation detection (FID)			
cyclohexane	0.005 to 0.10	1.6 % relative + 0.0001				
n-heptane	0.0025 to 0.10	1.6 % relative + 0.0001				
toluene	0.005 to 0.10	1.6 % relative + 0.0001				
methylcyclohexane	0.005 to 0.10	1.6 % relative + 0.0001				
n-octane	0.0005 to 0.05	1.6 % relative + 0.0001				
n-nonane	0.0005 to 0.02	1.6 % relative + 0.0001				
n-decane	0.0005 to 0.005	1.6 % relative + 0.0001				
oxygen	0.005 to 1	5.0 % relative			Calibration of gas mixtures using gas chromatography with thermal conductivity detection (TCD)	
helium	0.01 to 0.10	1.7 % relative + 0.0004				
hydrogen	0.0005 to 0.20	1.7 % relative + 0.0002				
			In-house method TM005	Tarapur		
nitrogen	0.1 to 12	0.25 % relative + 0.0090	Calibration of gas mixtures in accordance with ISO 6143:2001 using gas chromatography with thermal conductivity detection (TCD)			
carbon dioxide	0.05 to 1 1 to 8	0.0050 0.35 % relative + 0.0015				
methane	64 to 100	0.10 % relative				
ethane	0.1 to 14	0.3 % relative + 0.0055				
propane	0.05 to 8	0.3 % relative + 0.0025				
iso-butane	0.01 to 0.25 0.25 to 1.2	0.0016 0.65 % relative				
n-butane	0.01 to 0.25 0.25 to 1.2	0.0016 0.65 % relative				
neo-pentane	0.005 to 0.05 0.05 to 0.35	0.0012 1.6 % relative				
iso-pentane	0.005 to 0.10 0.10 to 0.35	0.0011 1.0 % relative				
n-pentane	0.005 to 0.10 0.10 to 0.35	0.0013 1.4 % relative				
n-hexane	0.005 to 0.10 0.10 to 0.35	0.0018 1.8 % relative				



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GAS MIXTURES (cont'd)	amount fraction (%mol/mol)	amount fraction (%mol/mol)		Tarapur
benzene	0.005 to 0.10	2.0 % relative + 0.0001	Calibration of gas mixtures using gas chromatography with flame ionisation detection (FID)	Tarapur
cyclohexane	0.005 to 0.10	2.0 % relative + 0.0001		
n-heptane	0.0025 to 0.10	2.0 % relative + 0.0001		
toluene	0.005 to 0.10	2.0 % relative + 0.0001		
methylcyclohexane	0.005 to 0.10	2.0 % relative + 0.0001		
n-octane	0.0005 to 0.05	2.0 % relative + 0.0001		
n-nonane	0.0005 to 0.02	2.0 % relative + 0.0001		
n-decane	0.0005 to 0.005	2.0 % relative + 0.0001		
oxygen	0.005 to 1	5.0 % relative		
Calculated values for:	Calculations valid for gas mixtures with amount fractions (%mol/mol)	relative (%)	Calculated values according to ISO 6976:1995 including amendment No.1, May 1998	Uttoxeter & Tarapur
calorific value (superior)		0.1	In-house method TM002	Uttoxeter
calorific value (inferior)		0.1		
relative density		0.1		
density		0.1		
Wobbe index		0.1		
mean molecular mass		0.1		
compression factor		0.1		
	amount fraction (ppm mol/mol)	amount fraction (ppm mol/mol)		
hydrogen sulphide	0.2 to 10	2 % relative + 0.03	Calibration of gas mixtures using gas chromatography with sulphur chemiluminescence detection (SCD)	Uttoxeter
carbonyl sulphide	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		
diethyl sulphide	0.2 to 10	2 % relative + 0.03		
methylethyl sulphide	0.2 to 10	2 % relative + 0.03		
tert-butyl mercaptan	0.2 to 10	2 % relative + 0.03		



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GAS MIXTURES (cont'd)	amount fraction (%mol/mol)	amount fraction (%mol/mol)	In-house method TM004	Uttoxeter
nitrogen	40 to 50	1 % relative	Calibration of gas mixtures in accordance with ISO 6143:2001 using gas chromatography with thermal conductivity detection (TCD)	
carbon dioxide	20 to 30	1 % relative		
hydrogen	1 to 8	1 % relative		
carbon monoxide	20 to 30	1 % relative		
GAS ANALYSERS	amount fraction (%mol/mol)	amount fraction (%mol/mol)	In-house method TM003	Uttoxeter or site
nitrogen	0.1 to 22	3.4 % to 0.4 % relative	Calibration of gas chromatographs used for natural gas analysis based on ISO 10723	
carbon dioxide	0.05 to 15	0.7 % relative + 0.007		
methane	34 to 100	0.15 % to 0.02 % relative		
ethane	0.1 to 23	0.50 % relative + 0.015		
propane	0.05 to 10	0.65 % relative + 0.005		
iso-butane	0.01 to 2.0	1.0 % relative + 0.0015		
n-butane	0.01 to 2.0	1.0 % relative + 0.0020		
neo-pentane	0.005 to 0.35	2.8 % relative + 0.0015		
iso-pentane	0.005 to 0.35	1.5 % relative + 0.0015		
n-pentane	0.005 to 0.35	2.4 % relative + 0.0010		
n-hexane	0.005 to 0.35	3.0 % relative + 0.0015		



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GAS ANALYSERS (cont'd)	amount fraction (%mol/mol)	amount fraction (%mol/mol)	In-house method TM006	Uttoxeter or site
C ₁ – C ₃	0.0008 to 100	amount fractions from 1% to 100% ±0.5% relative	Calibration of process gas analysers based on ISO 10723	
C ₄	0.001 to 50			
C ₅	0.001 to 9			
C ₆	0.001 to 1.5	amount fractions from 0.1% to 1% ±1% relative		
C ₇	0.001 to 0.5			
C ₈	0.001 to 0.2	amount fractions from 0.0008% to 0.1% ±2% relative		
C ₉	0.001 to 0.2			
C ₁₀	0.001 to 0.05			
benzene	0.001 to 1			
toluene	0.001 to 0.4			
xylenes m, p & o	0.001 to 0.1			
argon	0.1 to 100			
carbon dioxide	0.3 to 100			
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			
hydrogen sulphide	amount fraction (ppm mol/mol) 0.2 to 10	amount fraction (ppm mol/mol) 2% relative + 0.03		
END				