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BOC

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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 The Priestley Centre 10 Priestley Road The Surrey Research Park Guildford Surrey GU2 7XY	**Local contact** Dr K D Cleaver Tel: +44 (0)1483 244308 Fax: +44 (0)1483 450741 Email: kevin.cleaver@boc.com		Guildford
Address 28 Deer Park Road London SW19 3UF	**Local contact** Mr Paul Willson Tel: +44 (0)20 8542 6677 Fax: +44 (0)20 8543 9678 Email: paul.willson@boc.com	MOT Mixture Binary Gas Mixtures Ethanol/Air Mixture	Morden
Address Hobson Way Stallingborough Immingham NE Lincolnshire DN41 8DZ	**Local contact** Mr Walter Branowsky Tel: +44 (0)1469 577977 Fax: +44 (0)1469 576493 Email: walter.branowsky@boc.com	Natural Gas and Gravimetric Mixtures	Immingham

DETAIL OF ACCREDITATION

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty (*k*=2)	Remarks	Location Code
GAS MIXTURES				
QUATERNARY GAS MIXTURES	Volume fraction			Morden
Carbon monoxide Carbon dioxide Propane Nitrogen	3.5 % 14 % 2000 ppm balance	1.0 % relative 1.0 % relative 1.0 % relative		
BINARY GAS MIXTURES	Amount fraction			Morden
Propane/air	1.7 ppm to 4 ppm 4 ppm to 10 ppm 10 ppm to 25 ppm 25 ppm to 100 ppm 100 ppm to 1000 ppm	6.6 % to 3.1 % relative 3.1 % to 1.8 % relative 1.8 % to 1.0 % relative 1.0 % to 0.7 % relative 1.4 % to 0.7 % relative	Certification of binary gas mixtures against nationally traceable gas reference standards	
Carbon monoxide/nitrogen	2 ppm to 10 ppm 10 ppm to 40 ppm 40 ppm to 100 ppm 100 ppm to 1000 ppm 1000 ppm to 2000 ppm 2000 ppm to 1 % 1 % to 1.8 % 1.8 % to 10 %	2.6 % to 1.2 % relative 2.7 % to 1.0 % relative 1.0 % to 0.8 % relative 1.4 % to 0.7 % relative 1.5 % to 1.0 % relative 1.0 % to 0.7 % relative 1.5 % to 1.0 % relative 1.0 % to 0.7 % relative		
Carbon monoxide/air	2 ppm to 10 ppm 10 ppm to 40 ppm 40 ppm to 100 ppm 100 ppm to 1000 ppm 100o ppm to 2000 ppm 2000 ppm to 1 % 1 % to 1.8 % 1.8 % to 3.1 %	2.6 % to 1.2 % relative 2.7 % to 1.0 % relative 1.0 % to 0.8 % relative 1.4 % to 0.7 % relative 1.5 % to 1.0 % relative 1.0 % to 0.7 % relative 1.5 % to 1.0 % relative 1.0 % to 0.8 % relative		
Carbon dioxide/nitrogen	0.1 % to 0.2 % 0.2 % to 1 % 1 % to 5 % 5 % to 15 %	1.6 % to 1.0 % relative 1.0 % to 0.7 % relative 1.1 % to 0.7 % relative 1.1 % to 0.8 % relative		
Nitric oxide/nitrogen	2 ppm to 10 ppm 10 ppm to 20 ppm 20 ppm to 100 ppm 100 ppm to 200 ppm 200 ppm to 1000 ppm 1000 ppm to 2000 ppm 2000 ppm to 1 %	1.3 % to 1.1 % relative 1.1 % to 1.2 % relative 1.0 % to 0.7 % relative 1.5 % to 1.0 % relative 1.0 % to 0.7 % relative 1.5 % to 1.0 % relative 1.0 % to 0.7 % relative		
Oxygen/nitrogen	0.5 % to 2.0 % 2.0 % to 5 % 5 % to 25 %	2.2 % to 0.9 % relative 0.9 % relative 1.6 % to 1.3 % relative		

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty (k=2)	Remarks	Location Code
BINARY GAS MIXTURES (cont'd)				
Sulphur dioxide/nitrogen	10 ppm to 30 ppm 30 ppm to 60 ppm 60 ppm to 100 ppm 100 ppm to 300 ppm 300 ppm to 550 ppm 550 ppm to 1000 ppm 1000 ppm to 3000 ppm	1.7 % to 1.3 % relative 1.7 % to 1.2 % relative 1.2 % to 1.1 % relative 1.0 % to 0.9 % relative 1.3 % to 1.0 % relative 1.0 % relative 0.8 % to 0.5% relative		
ETHANOL IN AIR CALIBRATION STANDARD FOR EVIDENTIAL BREATH TESTING				Morden
Ethanol/air	35 μg Ethanol per 100 ml air equivalent to 191.4 ppm	0.4 μg per 100 ml air 2.0 ppm		
	22 μg Ethanol per 100 ml air equivalent to 120.3 ppm	0.3 μg per 100 ml air 1.6 ppm		
NATURAL GAS MIXTURES	Amount fraction (% mol/mol)	Amount fraction (% mol/mol)	Certification of Natural Gas mixtures against nationally traceable gas reference standards using gas chromatography in accordance with ISO 6143:2001	Immingham
Methane	55 to 100	0.1 % relative		
Ethane	0.008 to 0.1 0.1 to 1 1 to 11	2 % relative 1 % relative 0.35 % relative		
Propane	0.01 to 0.5 0.5 to 2 2 to 8	0.0035 0.3 % relative + 0.002 0.4 % relative		
i-Butane	0.004 to 0.16 0.16 to 1.2	0.0008 0.5 % relative		
n-Butane	0.004 to 0.24 0.24 to 1.3	0.0012 0.5 % relative		
i-Pentane	0.003 to 0.1 0.1 to 0.4	0.4 % relative + 0.0005 0.9 % relative		
n-Pentane	0.003 to 0.1 0.1 to 0.4	0.4 % relative + 0.0005 0.9 % relative		
neo-Pentane	0.002 to 0.02 0.02 to 0.4	0.0003 1.5 % relative		
Hexane	0.0009 to 0.1 0.1 to 0.35	0.0016 1.6 % relative		
C_6+	0.0009 to 0.1 0.1 to 0.35	0.0016 1.6 % relative	C_6+ is the sum of hydrocarbon amount fractions containing six carbon atoms or greater	
Nitrogen	0.02 to 1.25 1.25 to 20.4	0.005 0.4 % relative		
Carbon dioxide	0.09 to 0.8 0.8 to 12	0.0024 0.3 % relative		

Measured Quantity Instrument or Gauge	Range	Best Measurement Capability Expressed as an Expanded Uncertainty (k=2)	Remarks	Location Code
NATURAL GAS MIXTURES (cont'd)				
Calculated values for:	Calculations valid for gas mixtures with amount fractions		Calculation of physical properties in accordance	
Calorific Value (superior)	(% mol/mol):	0.1 % relative	with ISO 6976:1995	
Calorific Value (inferior)	Nitrogen <30 %	0.1 % relative		
Relative density	Carbon dioxide <15 %	0.1 % relative		
Density	Ethane <15 %	0.1 % relative		
Wobbe Index	Other components <5 %	0.1 % relative		
	Methane no restriction			
Mean Molecular Mass		0.1 % relative		
Compression Factor		0.1 % relative		
GAS MIXTURES	Amount fraction (% mol/mol)		Multi-component gaseous mixtures prepared by gravimetry in accordance with ISO 6142 with analytical validation against traceable standards.	Immingham
C_1 - C_3	0.0008 to 100	Amount fractions from 1 % to 100 %: ±0.5 % relative		
C_4	0.001 to 50			
C_5	0.001 to 9			
C_6	0.001 to 1.5			
C_7	0.001 to 0.5	Amount fractions from 0.1 % to 1 %: ±1.0 % relative		
C_8	0.001 to 0.2		Where more than 5 components fall within the above scope for Natural Gas, certification shall be using nationally traceable gas reference standards.	
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 and o	0.001 to 0.1	Amount fractions from 0.0008 % to 0.1 %: ±2.0 % relative		
Argon	0.1 to 100			
Carbon dioxide	0.03 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			
END				