


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>	<h3>National Physical Laboratory</h3> <p>Issue No: 042 Issue date: 13 March 2012</p>	
	<p>Hampton Road Teddington Middlesex TW11 0LW</p>	<p>Contact: Customer Helpline Tel: +44 (0)20 8943 7070 Fax: +44 (0)20 8614 6184 E-Mail: measurement_services@npl.co.uk Website: www.npl.co.uk</p>
<p>Testing performed by the Organisation at the locations specified below</p>		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
<p>Address Hampton Road Teddington Middlesex TW11 0LW</p> <p>Local contact Mr Tahir Maqba Customer Services Manager Tel: +44 (0)20 8943 6796 Fax: +44 (0)20 8943 6184 E-Mail: tahir.maqba@npl.co.uk Website: www.npl.co.uk</p>	<p>Support Functions: Quality System Quality Audit Administration</p> <p>Testing: Mechanical, metallurgical, physical and chemical testing</p> <p>Sampling and Testing: Stack Emissions Testing</p>	A
<p>Address University of Huddersfield Queensgate Huddersfield Building T4/04 HD1 3DH</p> <p>Local contact Lisa Leonard Tel: +44 (0) 20 8943 8716 Fax: +44 (0) 208 614 0482 E-mail: lisa.leonard@npl.co.uk Website: http://www.npl.co.uk/huddersfield</p>	<p>Testing: Dimensional testing</p>	D

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Customers' premises/sites	Sampling and analysis	B
Customer Sites requiring Stack Emissions Testing	Stack Emissions Testing	C



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DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS and ALLOYS	<u>Mechanical Tests</u> Vickers hardness (HV10 & 30)	BS EN ISO 6507-1:1998 (Superseded)	A
METALS, CERAMICS and COMPOSITE MATERIALS Including hardmetals, metal-matrix composites and ceramic-matrix composites	<u>Metallurgical Tests</u> Sizes of microstructural features	Documented in-house method QPCMATC/B/197 using optical microscopy	A
METALS, CERAMICS, PLASTICS, COATINGS: METALLIC and NON-METALLIC including oxides and corrosion products	<u>Chemical Tests</u> Quantitative elemental analysis Atomic numbers 11-92; Limit of detection 0.25 % Quantitative elemental analysis and element identification Atomic numbers 5-92	Documented in-house Methods QPCMMT/B/02V3.5, and QPDEPC/B/218V1.6 using scanning electron microscopy and energy dispersive X-ray analyser	A
	<u>Physical Tests</u> The Measurement Capability is expressed as an Expanded Uncertainty with a coverage factor of $k = 2$, providing a level of confidence of approximately 95 %		A
TURBINE BLADES	Dimensional testing of turbine fan blades up to 100 mm	Calibration and measurement capability of $\pm 5 \mu\text{m}$	D
THERMAL INSULATION PRODUCTS	Thermal conductivity/thermal resistance over the temperature range 5 °C to 40 °C and thickness up to 250mm Conductivity range up to 0.1 W/m.K Uncertainty $\pm 1.5 \%$	EN 12667:2001, EN 12939:2001 and ISO 8302:1991 using a 610 mm square NPL Guarded Hot-Plate and following documented in-house method QPDQM/B/402	A



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THERMAL INSULATION PRODUCTS (cont'd)	<u>Physical Tests</u> (cont'd) Thermal conductivity/thermal resistance over the temperature range 5 °C to 40 °C Conductivity range up to 0.1 W/m.K Uncertainty ± 2.5 %	EN 12667:2001, EN 12939:2001 and ISO 8301:1991 using a 610 mm square Heat Flow Meter and following documented in-house method QPDQM/B/421	A
	Thermal conductivity/thermal resistance over the temperature range – 175 °C to + 50 °C Conductivity range up to 0.15 W/m.K Uncertainty ± 2.5 %	EN 12667:2001 and ISO 8302:1991 using 305 mm diameter NPL Guarded Hot-Plate and following documented in-house method QPDQM/B/403	A
	Thermal conductivity/thermal resistance over the temperature range 140 °C to 800 °C Conductivity range up to 0.5 W/m.K Uncertainty ± 5 %	EN 12667:2001 and ISO 8302:1991 using 305 mm diameter NPL Guarded Hot-Plate and following documented in-house method QPDQM/B/401	A
HIGH TEMPERATURE PIPE INSULATIONS	Effective thermal conductivity, linear thermal transference, and surface heat transfer coefficient on pipe insulation with internal diameters of 48mm or 89 mm, over the temperature range 50 °C to 250 °C Conductivity range up to 0.075 W/m.K Uncertainty ± 1.5 %	EN ISO 8497:1997 and following documented in-house method QPDQM/B/423	A
HOMOGENEOUS and INHOMOGENEOUS MATERIALS	Thermal conductivity/thermal resistance over the temperature range - 50 °C to + 70 °C Conductivity 0.15 W/m.K to 2.0 W/m.K Uncertainty ± 3 %	EN 12664:2001 and ISO 8302:1991 using a 305 mm square NPL Guarded Hot-Plates and following documented in-house method QPDQM/B/403	A



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HOMOGENEOUS and INHOMOGENEOUS MATERIALS (cont'd)	<p><u>Physical Tests</u> (cont'd)</p> <p>Thermal conductivity/thermal resistance over the temperature range - 100 °C to + 250 °C</p> <p>Conductivity 0.1 W/m.K to 10 W/m.K Uncertainty ± 7.5 %</p>	ASTM E1530:06 using 50 mm diameter Guarded Heat Flow Meter and following documented in-house method QPDQM/B/422	A
METALS and ALLOYS	<p>Thermal conductivity/thermal resistance over the temperature range 50 °C to 500 °C</p> <p>Conductivity 10 W/m.K to 240 W/m.K Uncertainty ± 3.4 %</p>	Documented in-house method QPDQM/B/411 using Axial Flow Meter	A
STRUCTURES	<p>All measurements:-</p> <p>Cold air temperature - 10 °C to + 20 °C</p> <p>Hot air temperature max 40 °C</p>	<p>NPL Wall Guarded Hot Box designed and operated to documented in-house method QPDQM/B/407 based on BS EN ISO 8990:1996</p> <p>NPL Rotatable Wall Guarded Hot Box designed and operated to documented in-house method QPCBTLM/B/652 based on EN 8990:1996</p>	A
HOMOGENOUS PANELS	<p>U-value 0.2 to 10 (W/m².K) Uncertainty ± 4.5 %</p>		A
DOUBLE GLAZED UNITS	<p>U-value 0.2 to 6 (W/m².K) Uncertainty ± 5.5 %</p>	BS 6993:Part II:1990(1995) prEN 1098:1993	A
WHOLE WINDOW SYSTEMS	<p>U-value 0.2 to 10 (W/m².K) Uncertainty ± 5.5 %</p>	BS EN ISO 12567-1:2000 prEN 1098:1993 or specific documented in-house methods agreed with the client	A
HETEROGENOUS PANELS	<p>U-value 0.2 to 10 (W/m².K) uncertainty will depend on the test element</p>	BS EN ISO 12567-2:2005	A



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WHOLE ROOF WINDOW SYSTEMS AND OTHER PROJECTING WINDOWS	<u>Physical Tests</u> (cont'd) U-value 0.2 to 6 W/ m ² .K Uncertainty ± 5.5 % (Horizontal heat flow and vertical up heat flow)	BS EN ISO 12567-2:2005	A
SOLID MATERIALS Metals, metal alloys, ceramics, graphite	Thermal diffusivity 10 ⁻⁷ m ² .s ⁻¹ to 10 ⁻⁴ m ² .s ⁻¹ Uncertainty up to ± 4 % over temperature range ambient to 1650 °C	Documented in-house methods QPCMMT/B/180 (vertical technique) based on BS 7134 and ASTM E1461-92 using laser flash apparatus	A
LASERS	Laser classification	IEC 60825-1:1994 IEC 60825-2:2004	A
GAS MEASURING EQUIPMENT	Test Gases All of the following compliance tests may be conducted with any one or more of the following gases, at concentrations up to the maximum shown with [uncertainty] relative to the nominal concentration. The minimum concentration of each test gas, apart from zero gas, is 1 µmol/mol.	Environment Agency (MCERTS) Performance standards and test procedures for continuous emission monitoring systems. For gaseous, particulate and flow-rate monitoring systems. EN 15267-3:2007 Documented in-house method QPDQM/B/518 incorporating the requirements of the above documents	A
	SO₂ 10 gm ⁻³ [± 0.5 %] CO 15 gm ⁻³ [± 0.4 %] CO₂ 20 % mol/mol [± 1 %] NO 7 gm ⁻³ [± 0.5 %] NO₂ 10 gm ⁻³ [± 0.5 %] N₂O 4 gm ⁻³ [± 0.5 %] HCl 2 gm ⁻³ [± 3 %] NH₃ 100 mg m ⁻³ [± 3 %] H₂S 3 gm ⁻³ [± 3 %] CH₂Cl₂ 500 µmol/mol [± 1 %]		



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<p>GAS MEASURING EQUIPMENT (cont'd)</p> <p>Continuous Emission Monitoring Systems (CEMS) and Process Gas Analysers (cont'd)</p>	<p>Test Gases (cont'd)</p> <p>Volatile Organic Compounds (methane, propane, acetic acid, acetone, acrolein, formic acid, formaldehyde, methanol, ethane, ethene, propene, butane, acetaldehyde)</p> <p>10 mmol/mol [± 0.5 %]</p> <p>Halocarbons (112, 113, 113A, 114, 123)</p> <p>10 μmol/mol [± 2 %]</p> <p>Oxygen</p> <p>25 % mol/mol [± 0.5 %]</p> <p>Water Vapour</p> <p>45 % mol/mol [± 3 %]</p> <p>Zero Gas</p> <p>Zero and diluent gases contain < 0.1 % of measuring range</p> <p>Compliance Tests</p> <p>Linearity</p> <p>± 0.5 % of test range</p> <p>Repeatability</p> <p>± 0.5 % of concentration</p> <p>Response Time</p> <p>Step change of concentration to 90% of final value within 10 s [± 10 s]</p>		<p style="text-align: center;">A</p>



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<p>GAS MEASURING EQUIPMENT (cont'd)</p> <p>Continuous Emission Monitoring Systems (CEMS) and Process Gas Analysers (cont'd)</p> <p>Continuous Emission Monitoring Systems (CEMS)</p> <p>Stack Emissions - Continuous Emissions Monitoring Systems (CEMS)</p>	<p>Compliance Tests (cont'd)</p> <p>Test Gas Temperature Range 20 °C to 200 °C [± 1 °C]</p> <p>Test Gas Pressure Variation up to + 3 kPa [± 0.3 kPa]</p> <p>Ambient Temperature Range - 25 °C to + 70 °C [± 1 °C]</p> <p>Ambient Humidity Range 5 %rh to 95 %rh [± 3 %rh]</p> <p>Field Tests</p> <p>Lack of fit (linearity) Response time Maintenance interval Long term stability (Zero shift and span change) Reproducibility Availability Contamination check of in-situ Systems Calibration function tests</p> <p>Tests for gaseous monitoring CEMS for CO, CO₂, SO₂, O₂, H₂O, N₂O, NO and NO₂</p> <p>QAL 2, and the Annual Surveillance Test (AST) for CEMS</p>	<p>Environment Agency (MCERTS) Performance standards and test procedures for continuous emission monitoring systems. For gaseous, particulate and flow-rate monitoring systems.</p> <p>EN 15267-3:2007</p> <p>Documented in-house methods QPDQM/B/538, QPAS/B/542 and QPAS/B/555 incorporating the requirements of the above documents</p> <p>Documented in house method QPAS/B/542 to meet the requirements of BS EN 14181:2004, Environment Agency MID 14181 and other requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007</p>	<p style="text-align: center;">A</p>



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WORKPLACE AND AMBIENT ATMOSPHERIC POLLUTANTS, AND OTHER GAS SAMPLES	<u>Chemical Tests</u> Nitrogen Dioxide Nitrogen Monoxide Sulphur Dioxide	Ion Chromatography by UKAS accredited laboratory	A
Volatile Organic Compounds using Diffusive Tubes	0.001 to 200 ml/m ³ (ppm v/v) for some individual species	Documented in-house methods, based on MDHS 43, 50, 63 and 66 and ISO standard TC/146/SC2/WG4, using Gas Chromatography with a FID end point QPDQM/B/526	A
Volatile Organic Compounds using Pumped Sorbent Tubes	0.0001 to 200 ml/m ³ (ppm v/v) for some individual species	Documented in-house method based on MDHS 60 and 72 and ISO standard TC/146/SC2/N142 using Gas Chromatography with a FID end point QPDQM/B/527	A
Volatile Organic Compounds using Sorbent Sampler Tubes	<u>Physical Tests</u> 0.0001 to 200 ml/m ³ (ppm v/v) for some individual species with opinions and interpretations based on NIST research library	Documented in-house method based on BS EN ISO 16017-1&2, UK HSE MDHS 63, 72 & 80 using an automated thermal desorber gas chromatogram with a mass spectrometer and optional simultaneous flame ionisation detector (ATD/GC/MS-FID)	A
Total mercury from glass adsorption tubes containing gold-coated silica	Total mercury	Documented in-house method based on the draft European standard method being developed by CEN TC264 WG25	A
Black Smoke Index of suspended particulate matter	0 to 427 µg/m ³ equivalent to measured reflectance of 100 % to 30 % when sampling at 2.0 m ³ /day	Documented in-house method based on BS 1747-11:1993	A
Weight of suspended particulate matter	25 ug to 7 mg equivalent to 1 µg/m ³ for a 1 m ³ /hour sampler to 120 µg/m ³ for a 2.3 m ³ /hour sampler	Documented in-house method based on BS EN 14907:2005	A



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WORKPLACE AND AMBIENT ATMOSPHERIC POLLUTANTS, AND OTHER GAS SAMPLES (cont'd)	<u>Chemical Tests</u>		
	C2 to C10 hydrocarbons, Nitrogen dioxide Nitrogen monoxide Sulphur dioxide Volatile organic compounds	Documented in-house methods using pumped and diffusive sorbent tubes QPDQM/B/522, 523, 525, 526, 527	B
Cellulose filters Acid digests (nitric acid and hydrogen peroxide)	Arsenic Cadmium Chromium Copper Iron Lead Manganese Nickel Vanadium Zinc	Microwave digestion (for cellulose filters) and inductively coupled plasma - mass spectrometry (ICP-MS) Documented in-house method QPAS/B/533 in conformance with EN 14902:2004	A
Cellulose filters Acid digests (nitric acid and hydrochloric acid)	Mercury Platinum	Microwave digestion (for cellulose filters) and inductively coupled plasma - mass spectrometry (ICP-MS) Documented in-house method QPAS/B/534	A
Particulate matter on filters or in aqueous solution	Fluoride, chloride, nitrate and sulphate Anions	Documented in-house method QPAS_B_552 using ion chromatography	A
Glass/quartz fibre filters Acid digests (nitric acid, boric acid and hydrofluoric acid)	Arsenic Cadmium Chromium Cobalt Copper Manganese Nickel Antimony Thallium Vanadium Mercury Lead	Microwave digestion (for glass/quartz filters) and inductively coupled plasma - mass spectrometry (ICP-MS) Documented in-house method QPAS/B/533 and RMG 421 in accordance with BS EN 14385:2004 and BS EN 13211:2001	A



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WORKPLACE AND AMBIENT ATMOSPHERIC POLLUTANTS, AND OTHER GAS SAMPLES (cont'd)	<u>Physical Tests</u>		
Filter Papers and Rinse Solutions	Weighing of Particulate Matter	BS EN 13284-1:2002 BS ISO 9096:2003 (QPAS/B/536))	A
Testing of Stack Emissions to Atmosphere	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory</u>	National, International and other recognised standards using documented in-house methods to meet the requirements of DD CEN/TS 15675:2007/ BS EN 15259:2007	
	Ammonia	US EPA Method 26 (QPAS/B/540)	C
	<u>Sampling and On-Line Analysis</u>		
	Sulphur dioxide	ISO 7935:1992 (BS 6069-4.4:1993) (QPAS/B/538)	C
	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory</u>	National, European, International and Environment Agency specified standards including MIDs and documented in-house methods to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	
	Total Particulate Matter (0 mg/m ³ to 50 mg/m ³)	BS EN 13284-1:2002 (QPAS/B/536)	C
	Total Particulate Matter (20 mg/m ³ to 1000 mg/m ³)	BS ISO 9096:2003 (QPAS/B/536)	C
	Hydrogen chloride	BS EN 1911:2010 (QPAS/B/540)	C
	Hydrogen fluoride	BS ISO 15713:2006 (QPAS/B/540)	C



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory</u>	National, European, International and Environment Agency specified standards including MIDs and documented in-house methods to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	
	Sulphur dioxide	BS EN 14791:2005 (QPAS/B/540)	C
	Ammonia	BS EN 14791:2005 (QPAS/B/540)	C
	Metals	BS EN 14385:2004 (QPAS/B/537)	C
	Mercury	BS EN 13211:2001 (QPAS/B/537)	C
	Dioxins and Furans	BS EN 1948-1:2006 (QPAS/B/539)	C
	Dioxin-like Polychlorinated Biphenyls (PCBs)	BS EN 1948-1:2006 (QPAS/B/539)	C
	Polycyclic Aromatic Hydrocarbons (PAHs)	BS ISO 11338-1:2003 (QPAS/B/539)	C
	<u>Sampling and On-Line Analysis</u>		
	Pressure, Temperature and Velocity	ISO 10780:1994 BS EN 13284-1:2002 BS ISO 9096:2003 (QPAS/B/536)	C
	Water vapour (gravimetric analysis)	BS EN 14790:2005 (QPAS/B/536)	C
Carbon dioxide*	ISO 12039:2001 (QPAS/B/538 - NDIR analyser)	C	
Carbon monoxide*	BS EN 15058:2006 (QPAS/B/538 - NDIR analyser)	C	



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling and On-Line Analysis</u>	National, European, International and Environment Agency specified standards including MIDs and documented in-house work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	
	Oxides of nitrogen*	BS EN 14792:2005 (QPAS/B/538 - Chemiluminescence analyser)	C
	Sulphur dioxide*	EA TGN M21 (QPAS/B/538 - NDIR analyser)	C
	Oxygen*	BS EN 14789:2005 (QPAS/B/538 - Validated paramagnetic analyser) (QPAS/B/538 - Validated zirconium cell analyser) (QPAS/B/538 - Validated electrochemical cell analyser)	C
	Total Gaseous Organic Carbon* (TOC / VOC) (20 mg/m ³ to 500 mg/m ³)	BS EN 13526:2002 (QPAS/B/538 - FID analyser)	C
Total Gaseous Organic Carbon* (TOC / VOC) (0 mg/m ³ to 20 mg/m ³)	BS EN 12619:1999 (QPAS/B/538 - FID Analyser) * The scale range of the analyser used for this test must be that detailed on its current MCERTS certificate or a range validated by the organisation to meet MCERTS requirements.	C	



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Testing of Stack Emissions to Atmosphere (cont'd)	<p><u>Sampling and On-Line Analysis</u></p> <p>Sampling and on-line analysis of gas phase chemicals from stacks, ducts and flues, including:</p> <p>carbon monoxide nitrogen monoxide sulphur dioxide hydrogen chloride water vapour</p> <p>A controlled list of chemical species covered by this method is maintained by the laboratory.</p>	Environmental Agency TGN M22: Measuring stack gas emissions using FTIR Instruments.	A,C
END			