


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <p><b>0034</b></p> <p>Accredited to <b>ISO/IEC 17025:2005</b></p>	<h3>Keighley Laboratories Ltd</h3> <p><b>Issue No: 029    Issue date: 14 July 2011</b></p>	
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<p><b>Testing performed at the above address only</b></p>		

### DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
<b>METALS, ALLOYS and METAL PRODUCTS</b>	<u>Chemical Tests</u>	
Ferrous and Non-ferrous alloys including:	Elemental Analysis	Atomic absorption, emission and glow discharge spectroscopy, ICP, Photometric, Gravimetric and Titrimetric Methods to: BS Handbook No.19:1970 (withdrawn) ASTM Annual Book of Standards (Volume 03.05/6)
Plain carbon, low and high alloy steels and stainless steels	C, Si, Mn, P, S, Cr, Mo, Ni, Al, Cu, B, Co, Pb, Ti, V, Nb, W, Sn, Mg, Se, Te, As, Zn, Zr, Fe, Bi, Ca, Cd, Cs, Sb, Ta, N <sub>2</sub> , O <sub>2</sub> , Ce	
Nickel and Cobalt Alloys	C, Si, Mn, P, S, Cr, Mo, Ni, Al, Cu, B, Co, Pb, Ti, V, Nb, W, Sn, Mg, Zr, Fe, Ta, N <sub>2</sub> , O <sub>2</sub>	
Copper and Copper Alloys	C, Si, Mn, P, S, Cr, Ni, Al, Cu, B, Co, Pb, Ti, Sn, Mg, Se, Te, As, Zn, Zr, Fe, Ag, Bi, Cd, Sb, Be, N <sub>2</sub> , O <sub>2</sub>	
Zinc and Zinc Alloys	Si, Mn, Cr, Ni, Al, Cu, Pb, Ti, Sn, Mg, Zn, Fe, Bi, Cd, Sb, In	
Tin and Lead Alloys	Mn, S, Ni, Al, Cu, Pb, Sn, Se, Te, As, Zn, Fe, Ag, Bi, Cd, Sb, In, Au	
Magnesium Alloys	Si, Mn, Cr, Ni, Al, Pb, Ti, Sn, Mg, Zn, Zr, Fe, Cu	
Aluminium & Aluminium Alloys	Si, Cu, Mg, Fe, Mn, Ni, Zn, Pb, Sn, Ti, Cr, Zr, Sr.	



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Chemical Tests</u>	
Plain carbon, low and high alloy steels	Carbon and Sulphur	Documented In-House Methods CL029 & CL 030 using Leco oxygen fusion
Stainless steels	Nitrogen and Oxygen	Documented In-House Method CL060 using Leco inert gas fusion
Copper alloys		
Nickel alloy		
Steels and Nickel alloys	Categorisation of alloys	Documented In-House Method MT562 using Analoy Metalscan 1625 spark analyser <u>OR</u> Niton XLt 898 XRF Alloy Analyser
	<u>Corrosion Tests</u>	
Stainless Steels, Plated, Painted or Coated test panels and Components	Salt spray	BS EN 60068-2-11:1999 BS 3900:Part F4:1968(2000) BS 3900:Part F12:1997 (Withdrawn) ASTM B117-03 ASTM G85-02 <sup>e1</sup> Appendix 5 FORD EU B1 103-1 (April 1985) NISSAN MO 140 (1985) and technically equivalent specifications
Austenitic Stainless Steels	Ferric chloride pitting test	ASTM G48-03 Method A
Heat-resisting Alloys	Ferric sulphate/sulphuric acid	ASTM G28-02 Method A
	Moneypenny Strauss test	BS 5903:1980 (Withdrawn) ASTM A262- 02a <sup>e3</sup> :Practice E BCAR A8-10 CI 4.22 BAe R05 4534
	Streicher test	ASTM A262- 02a <sup>e3</sup> :Practice B
	Susceptibility to intergranular attack	BS EN ISO 3651-1:1998 BS EN ISO 3651-2:1998
Paints and organic coatings	Humidity	BS 3900:Part F2:1973(2000) ASTM D2247-02



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Mechanical Tests</u>	
Ferrous and Non-ferrous Metals and Alloys	Proof Loading	Documented In-house Method MT412
	Tensile at ambient (forces 0 kN to 1100 kN)	BS 4A.4 Part 1 Section1:1966 BS EN 2002-1:2005 BS EN ISO 6892-1:2009 ASTM E8M-08
	Tensile at 203K to ambient	Documented In-House Method MT115
	Tensile elevated temperatures up to 700°C (Forces 0 kN to 100 kN)	BS EN 10002-5:1992 (Withdrawn)
	Axial fatigue test	Documented In-House Method MT406
	Impact: Charpy (-196°C to ambient) 'V' and 'U' notch	BS EN 10045-1:1990
	Izod	BS 131 Part 1:1961(1996)
	Crystallinity	BS 131:Part 5:1965(1996)
	Brinell Hardness (5/750 & 10/3000)	BS EN ISO 6506-1:2005 ASTM E10-10
	Brinell Hardness (portable) Comparative method	Documented In-House Method MT 310
	Vickers Hardness (HV 1.0, HV10 & HV30)	BS EN ISO 6507-1:2005
	Vickers Hardness (HV0.1, HV0.2, HV0.3, HV0.5 & HV1.0)	BS EN ISO 6507-1:2005 ASTM E384-10 <sup>e2</sup>
	Rockwell Hardness (HRC & HRBW also HRA, HR15N & HR30N)	BS EN ISO 6508-1:2005 ASTM E18-08b



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Mechanical Tests (cont'd)</u>	
Ferrous and Non-ferrous Metals and Alloys	Bend	BS EN ISO 7438:2005
	Shear	BS EN 28749:1992
Bolts, Screws and Nuts	Proof loading Tensile Strength under wedge loading	BS 4395-1:1969(Superseded) BS 4395-2:1969(Superseded) BS EN ISO 898-1:1999 BS EN 20898-2:1994 BS EN ISO 3506-1:1998
	Axial fatigue test	Documented In-House Method MT406 based on principles of BS 3518-1 and BS 3518-3
Tubular Products	Flattening	BS EN ISO 8492:2004
Ferrous and Non-ferrous Metals and Alloys	<u>Metallurgical Tests</u>	
	Carburised and surface hardened case depths	BS 6286:1982(2005) BS 6481:1984( Withdrawn) BS EN ISO 2639:2002
	Decarburisation	BS EN ISO 3887:2003 Microscopic method ASTM E1077-01(03) Micro hardness method
	Metallic & oxide coating thickness	BS EN ISO 1463:2004 BS EN ISO 2064:2000 ASTM B487-85(2002)
	Inclusion content	ASTM E45-05 (2009)
	Grain size - comparative method	ASTM E112-10
	Volume Fraction Manual point count method	Documented In-House Method MT 424 ASTM E562-08 BS 7590:1992 AMS 2315F



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Metallurgical Tests (cont'd)</u>	
	Graphite in Iron castings	ASTM A247-10 BS EN ISO 945-1:2008
	Microstructural evaluation	Documented In-House Method MT 404
	Macroetch examination	Documented In-House Method MT 404 API 6A718 2 <sup>nd</sup> Edition
Surface evaluation for machining damage	Resulting from machining operations(including, but not restricted to- laser, Electron beam, EDM, ECM, & grinding)	Documented In-House Method MT 423
	Ferrite Determination Fischer Feritscope	Documented In-House Method MT555
Steel, titanium & titanium alloy fasteners	Metallurgical examination (Grain flow and thread irregularities)	BAe R25-0498 BAe ABP 2-2333 Documented In-House Method MT422
Aluminium alloys and Clad Aluminium Alloys	Metallurgical examination - High Temperature Induced Porosity (HTO) - Eutectic Melting - Intergranular Corrosion - Diffusion in the Cladding	AMS 2772E Section 4.4 ASTM G110-92(2009) Shorts P Specification 401 Issue 9 McDonnell Douglas HP 1-2 Section 4 (Rev R) Documented In-House Method MT 416
METALS, ALLOYS and METAL PRODUCTS	Relative Magnetic Permeability Comparative method only on feebly magnetic materials using <u>Ferromaster permeability meter</u> <u>or</u> <u>Comparator beam meter</u>	Documented In-House Method MT 552



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<p><u>Mechanical and Metallurgical Tests</u></p> <p>Test designated in specified welding codes, excluding non-destructive testing, as detailed below -</p> <p>Bend, Fracture, Hardness, Impact, Tensile, Visual examination, Macro and Micro-examination</p>	<p>BS EN 287:Part 1:2004 BS 4870:Part 4:1988(Withdrawn) BS 4871:Part 3:1985 BS 4872:Part 1:1982(2006) BS 4872:Part 2:1976(2006) BS EN ISO 9606-2:2004 BS EN ISO 15614-1:2004 BS EN ISO 15614-2:2005 BS EN ISO 15614-8:2002 BS EN 875:1995 BS EN 876:1995 BS EN 895:1995 BS EN 910:1996 BS EN 1043-1:1996 BS EN 1320:1997 BS EN 1321:1997 BS ISO 24394:2008 AVP 84,D505:1969 Airbus UK ABP2-4099 Airbus UK ABP2-4100 Airbus UK ABP2-4355 BAe R05-6116 BAe R05-6118 BAEP 4534 BCAR A8-10 IAA P4 (Clauses 4 &amp; 5 only) RPS 912 ASME IX:2004 AWS D17.1 Technically equivalent documented plans agreed with clients.</p>
WELDMENTS		
Automotive Parts	<p><u>Physical Tests</u></p> <p>Assessment of cleanliness:- - Residue quantity - Particle size</p>	<p>Documented In-House Method based on A E Goetze Spec ES-V12-1</p>



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METALS, ALLOYS and METAL PRODUCTS (cont'd)  Weldments, Castings and Wrought Ferrous Metals and Alloys	<u>Non-Destructive Tests</u>  *Magnetic Particle Colour contrast and fluorescent	BS 6072:1981 (superseded) BS EN 1290:1998 BS EN 10228- 1:1999 BS EN ISO 9934-1: 2001 ASME V:2010 ASTM E709-01
	*Liquid Penetrant Colour contrast and fluorescent	BS EN 571-1:1997 BS EN 10228-2:1998 BS M39:1972 (1998)ASME V:2007 ASME V:2010 ASTM E165-02
Weldments, Castings and Wrought Ferrous Metals and Alloys (cont'd)	*Ultrasonic Flaw Detection Manual Contact Method	BS 6208:1990 (withdrawn) BS EN 1714:1998(2003) BS EN 10160:1999 BS EN 10228-3:1998 BS EN 10228-4:1999 BS EN 12680-1: 2003 BS EN 12680-2: 2003
	Ultrasonic thickness monitoring, (range 1.2 mm to 200 mm)	Documented In-House Method MT551
	*Under the supervision of suitably authorised personnel	
	<u>END</u>	