


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>Keighley Laboratories Ltd</h3>	
	<p>Issue No: 027 Issue date: 26 August 2009</p>	
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<p>Testing performed at the above address only</p>		

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
<p>METALS, ALLOYS and METAL PRODUCTS</p> <p>Ferrous and Non-ferrous alloys including:</p> <p>Plain carbon, low and high alloy steels and stainless steels</p> <p>Nickel and Cobalt Alloys</p> <p>Copper and Copper Alloys</p> <p>Zinc and Zinc Alloys</p> <p>Tin and Lead Alloys</p>	<p><u>Chemical Tests</u></p> <p>Elemental Analysis</p> <p>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, Ag, Ba, Bi, Ca, Cd, Cs, Sb, Ta, N₂, O₂, Ce</p> <p>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, Ag, Bi, Ca, Cd, Sb, Ta, N₂, O₂</p> <p>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, Ag, Bi, Cd, Sb, Ta, In, Be, N₂, O₂</p> <p>Si, Mn, P, Cr, Ni, Al, Cu, Co, Pb, Ti, Sn, Mg, As, Zn, Fe, Ag, Bi, Cd, Sb, In</p> <p>Mn, S, Ni, Al, Cu, Co, Pb, Sn, Se, Te, As, Zn, Fe, Ag, Bi, Cd, Sb, In, Au</p>	<p>Atomic absorption, emission and glow discharge spectroscopy, Photometric, Gravimetric and Titrimetric Methods to:</p> <p>BS Handbook No.19:1970 (withdrawn)</p> <p>ASTM Annual Book of Standards (Volume 03.05/6)</p> <p>BS 1728</p> <p>BS 1748</p> <p>BS 3907</p> <p>BS 6200</p> <p>Documented In-House Method CL200.2 & Method CL200.3 & Method CL200.4 using Perkin Elmer Optimax 2000 DV</p> <p>I.C./O.E.S</p>



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Chemical Tests</u>	
Aluminium and Magnesium Alloys	Si, Mn, P, Cr, Ni, Al, B, Co, Pb, Ti, V, Sn, Mg, As, Zn, Zr, Fe, Ag, Ba, Bi, Ca, Cd, Cs, Sb, Sr, Li, Na, K, Ga, Ge, Be, Cu, In	
Steels and Nickel alloys	Categorisation of alloys	Documented In-House Method MT562 using Analy Metalscan 1625 spark analyser <u>OR</u> Niton XLt 898 XRF Alloy Analyser
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		
Aluminium & Aluminium Alloys	Cu, Mg, Fe, Mn, Ni, Zn, Pb, Sn, Ti, Cr, Zr, Sr.	Documented In-House Method CL200 using Perkin-Elmer Optima 2000 DV I.C.P/O.E.S
	<u>Corrosion Tests</u>	
Stainless Steels, Plated and Painted 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 ^{e1} Appendix 5 FORD EU B1 103-1 NISSAN MO 140 and technically equivalent specifications
Austenitic Stainless Steels	Ferric chloride pitting test	ASTM G48-03 Method A Shell EXPO ES247 RN1
Heat-resisting Alloys	Ferric sulphate/sulphuric acid	ASTM G28-02 Method A
	Moneypenny Strauss test	BS 5903:1980 (Withdrawn) ASTM A262- 02a ^{e3} .Practice E BCAR A8-10 CI 4.22 BAe R05 4534



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Corrosion Tests</u>	
	Streicher test	ASTM A262- 02a ^{e3} :Practice B
Paints and organic coatings	Susceptibility to intergranular attack	BS EN ISO 3651-1:1998 BS EN ISO 3651-2:1998
	Humidity	BS 3900:Part F2:1973(2000) ASTM D2247-02
Ferrous and Non-ferrous Metals and Alloys	<u>Mechanical Tests</u>	
	Proof Loading	Documented In-house Method MT412
	Tensile at ambient (forces 0 kN to 1100 kN)	BS EN 10002-1:2001 ASTM E8m-04 BS 4A.4 Part 1 Section1 BS EN 2002-1:2005
	Tensile elevated temperatures up to 1073K (Forces 0 kN to 100 kN)	BS EN 10002-5:1992
	Axial fatigue test	Documented In-House Method MT406 based on principles of BS 3518-1 and BS 3518-3
	Tensile at 203K to ambient	Documented In-House Method MT115
	Impact: Charpy (77K to ambient)	BS EN 10045-1:1990
	'V' and 'U' notch	
	Izod	BS 131 Part 1:1961(1996)
	Vickers Hardness >HV5 Vickers Hardness HV0.2 to HV5	BS EN ISO 6507-1:1998 (Superseded)
Brinell Hardness	BS EN ISO 6506-1:1999 (Superseded) ASTM E10-05	
Rockwell Hardness	BS EN ISO 6508-1:1999 (Superseded) ASTM E18-05 ^{e1}	



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Mechanical Tests</u>	
	Comparative Vickers Micro-hardness,	Documented In-House method MT303 based on ASTM E384-89 (1997)
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
	<u>Metallurgical Tests</u>	
	Carburised and surface hardened case depths	BS 6286:1982(2005) BS EN ISO 2639:2002 BS 6481:1984(Withdrawn) BS EN ISO 2639:2002
	Metallic & oxide coating thickness	BS EN ISO 1463:2004 BS EN ISO 2064:2000 ASTM B487-85(2002)
	Crystallinity	BS 131:Part 5:1965(1996)
Surface evaluation for machining damage	Resulting from machining operations(including, but not restricted to- laser, Electron beam, EDM, ECM, & grinding)	In house procedure MT 423
	Grain size - comparative method	ASTM E112-96(2004)
	Inclusion content	ASTM E45-97(2002)
	Decarburisation	BS EN ISO 3887:2003 Microscopic method



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Metallurgical Tests</u>	
Steel, titanium & titanium alloy fasteners	Metallurgical examination (Grain flow and thread irregularities)	BAe R25-0498 BAe ABP 2-2333 Documented In-House Method MT422
Clad aluminium alloys	Metallurgical examination - High Temperature Oxidation - Intergranular Corrosion - Diffusion in the Cladding - Eutectic Melting	AMS 2772C Section 4.4 ASTM G110-92(2003) ^{e1} Shorts P Specification 401 Issue 4 McDonnell Douglas HP 1-2 Section 4
Weldments, Steels and Aluminium Alloys	<u>Mechanical and Metallurgical Tests</u> Test designated in specified welding codes, excluding non-destructive testing, as detailed below - Bend, Fracture, Hardness, Impact, Tensile, Visual examination, Macro and Micro-examination	BS EN 287:Part 1:2004 BS EN ISO 9606-2:2004 BS EN ISO 15614-1:2004 BS EN ISO 15614-2:2005 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 EN ISO 15614-8:2002 BS 4870:Part 4:1988(Withdrawn) BS 4871:Part 3:1985 BS 4872:Part 1:1982(2006) BS 4872:Part 2:1976(2006) AVP 84,D505:1969 ASME IX:2004 BCAR A8-10 BAe R05-6116 BAe R05-6118 BAe 4534 BAe ABP2-4099 BAe ABP2-4100 Airbus UK ABP 2-4355 RR RPS912 IAA P4 AWS D17.1 Technically equivalent documented plans agreed with clients.



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METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Non-Destructive Tests</u>	
Weldments, Castings and Wrought Ferrous Metals and Alloys	*Magnetic Particle	BS EN ISO 9934-1: 2001 BS EN 1290:1998 BS EN 10228- 1:1999 ASME V:2004 ASTM E709-01
	*Liquid Penetrant Colour contrast and fluorescent	BS EN 571-1:1997 BS M39:1972(1998) BS EN 10228-2:1998 ASTM E165-02
Weldments, Castings and Wrought Ferrous Metals and Alloys (cont'd)	*Ultrasonic Flaw Detection Manual Contact Method	BS EN 1714:1998(2003) BS 6208:1990 (withdrawn) BS EN 12680-1: 2003 BS EN 12680-2: 2003 BS EN 10228-3:1998 BS EN 10228-4:1999 BS EN 10160:1999
	Ultrasonic thickness monitoring, (range 1.2 mm to 200 mm)	Documented In-House Method MT551
	<u>Physical Tests</u>	
Automotive Parts	Assessment of cleanliness:- - Residue quantity - Particle size	Documented In-House Method based on A E Goetze Spec ES-V12-1
	*Under the supervision of suitably authorised personnel	
END		