

# 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>Rotech Laboratories Ltd</h3> <p>Issue No: 026    Issue date: 11 March 2011</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
METALS, ALLOYS and METAL PRODUCTS	<u>Chemical Tests</u>	
Aluminium alloys	Elemental analysis Si, Fe, Mn, Cu, Mg, Zn, Cr, Pb, Sn	Documented In-House Method RP115 using spark source Optical Emission Spectroscopy
Aluminium alloys (Wrought)	Fe, Cu, Mn, Mg, Cr, Ni, Zr, Ti, Pb, Sn, Zr, V, Ga, Bi	Documented In-House Methods RP 116 & 117 using ICP-OES
Stainless steels	Mn, Si, P, Cu, Ni, Cr, Mo, V, Ti, Al Nb	Documented In-House Methods RP 116 & 117 using ICP-OES
Steels	Mn, Si, P, Cu, Ni, Cr, Mo, V, Ti, Al, Nb, B	Documented In-House Methods RP 116 using ICP-OES
Plain carbon, low alloy, stainless and tool steels, and cast iron	Elemental analysis C, Mn, Si, S, P, Cu, Ni, Cr, Mo, Sn, Nb, V, Al, Ti, B, Zr, Pb, W, Co, Mg	Documented In-House Method RP103 using Optical Emission Spectroscopy
	Determination of Carbon and Sulphur	Documented In-House Method RP137
Cast iron, copper alloys, ferro alloys, high alloyed steels, low alloyed steels, nickel and cobalt alloys, plain carbon steels and refractories	Qualitative and Semi-Quantitative analysis of elements above atomic No.5	Documented In-House Method RP 362 using Energy Dispersive Spectroscopy
High alloyed steels, low alloyed steels, nickel and cobalt alloys, plain carbon steels.	Determination of Nitrogen	Documented In-House Method RP136



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METALS, ALLOYS and METAL PRODUCTS	<u>Corrosion Tests</u>	
Austenitic stainless steels	Susceptibility to intergranular corrosion	BS 5903:1980(1987)(Withdrawn) ASTM A262-02a Practice C & E ASTM G48-03 DIN 50914:1996
Wrought nickel rich chromium bearing alloys	Susceptibility to intergranular corrosion	ASTM G28-02 Methods A & B
METALS, ALLOYS and METAL PRODUCTS	<u>Mechanical Tests</u>	
	Bend	BS EN ISO 5173:2010 BS EN ISO 7438:2005 BS 6323:Part 1:1982(1990) BS EN 10216-1:2002 BS EN 10216-2:2002 BS EN 10216-4:2002 BS EN 10216-5:2004 BS EN 10217-1:2002 BS EN 10217-2:2002 BS EN 10217-3:2002 BS EN 10217-4:2002 BS EN 10217-5:2002 ASTM A370-09a <sup>e1</sup>
	Hardness:	
	Brinell (5/750, 10/3000)	BS EN ISO 6506-1:2005 ASTM E10: 10
	Hardness:	
	Rockwell (Scales 30N, 30T, B&C)	BS EN ISO 6508-1:2005 ASTM E18-08b
	Vickers (HV10 & 30) Vickers low load (HV 0.3, 0.5, 1 ) Microhardness (HV 0.05 & 0.10)	BS EN ISO 6507-1:2005



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METALS, ALLOYS and METAL PRODUCTS	<u>Mechanical Tests</u>  Impact:  Izod  Charpy (V- and U- notches) (77K to ambient)  Crystallinity  Tensile (temperatures from ambient to 873K, forces from 2 kN to 500 kN)	BS 131:Part 1:1961(1989)  BS EN 10045-1:1990 ASTM E23-07  BS 131:Part 5:1965(1990)  BS EN ISO 6892-1:2009 Method B BS EN 10002-5:1991 ASTM E8-08 ASTM E8M-08 ASTM E21-05 ASTM A370-09a <sup>e1</sup> ASTM B557-06 ASTM B557M-06
Pipes and tubes	Crush, Drift, Flattening, Reverse flattening and Flaring	BS EN 10216-1:2002 BS EN 10216-2:2002 BS EN 10216-4:2002 BS EN 10216-5:2004 BS EN 10217-1:2002 BS EN 10217-2:2002 BS EN 10217-4:2002 BS 6323:Part 1:1982(1990) ASTM A370-08b ASTM A450-03 ASTM A450M-03 ASTM A530-03 ASTM A530M-03
Fasteners	Proof Load Tensile Strength (excluding 0.2% proof stress)	BS 4395:Part 1:1969 BS 4395:Part 2:1969 BS 4439:1969 BS 4882:1990 BS EN ISO 898-5:1999 BS EN ISO 3506-1:1998 BS EN ISO 3506-2:1998 BS EN ISO 898-1:1999 BS EN 20898-2:1994



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METALS, ALLOYS and METAL PRODUCTS  Fasteners	<u>Mechanical Tests</u>  Proof Load Tensile Strength (excluding 0.2% proof stress)  <u>Metallurgical Tests</u>  Case depth  Decarburization depth  Partial decarburization depth  Dezincification  Grain size  Graphite evaluation  Inclusion content (Method A only)  Macro etch  Fractographic and microscopical examination  <u>Metallurgical Tests</u>  Volume fraction	ISO 898-2:1992 BS EN ISO 898-6:1996 ASTM F606-07 ASTM F606M-07 Documented In-House Method RP 213 DIN 267 Part 10:1988 DIN 267 Part 11:1980 (Withdrawn)  BS 6286:1982(1989) BS EN ISO 2639:2002 BS 6481:1984(1990)  BS EN ISO 3887:2003  BS EN ISO 898-1:1994  BS EN ISO 6509:1995  BS EN ISO 643:2003 ASTM E112-96(2004) <sup>e2</sup> (Method A)  ASTM A247-67 (1998) BS EN ISO 945: 1994  BS 5710:1979(1991) ISO 4967:1979(E) ASTM E45-05 <sup>e2</sup>  BS 6533:1984(1990)  Documented In-House Method RP 361  BS 7590:1992 ASTM E562-02



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<p>METALS, ALLOYS and METAL PRODUCTS</p> <p>Weldments and Brazing</p>	<p>Tests designated in specified Welding Codes as detailed below:-</p> <p>Bend, Fracture, Hardness, Impact, Tensile, Visual examination, Macro examination</p>	<p>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 ISO 5173:2010 BS EN 970:1997 BS EN 1043-1:1996 BS EN 1043-2:1997 BS EN 1320:1997 BS EN 1321:1997 BS EN ISO 15614-8:2002 BS EN ISO 15614-11:2002 BS 1140:1993 BS 1723:Part 3:1988(Withdrawn) BS 2630:1982(1991) BS 7670:Part 2:1997 BS 3451:1973(1981) BS 4871:Part 3:1985 BS 4872:Part 1:1982 BS 4872:Part 2:1976 BS EN ISO 15620:2000 BS 6265:1982(1991) ASME 1X:2007 T/SP/P1-Feb 02 T/SP/P2-Sept 03 BGC/PS Part P5:1976 BGC/PS Part P8:1975 T/SP/P9- April 03 DGQA AV.P84 D505 1969 BCAR A8-10 BS EN ISO 15613:2004 BS EN 288-9:1999 BS EN ISO 9018:2003</p>
<p>METALLIC COATINGS</p>	<p><u>Corrosion Tests</u></p> <p>Neutral salt spray</p>	<p>BS 7479:1991 ASTM B117-07 DIN 50 021:1988</p>



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METALLIC COATINGS	<u>Metallurgical Tests</u>	
	Plating/coating thickness	BS EN ISO 1463:2004 BS EN 12540:2000
	Coating mass	BS EN 10326:2004 BS EN 10327:2004 BS EN 10152:2003 BS EN 12329:2000
	<u>Chemical Test</u>	
Chromate treated surfaces	Presence of hexavalent chromium	Documented In-house Method RP110
PAINT and VARNISHES	<u>Environmental Tests</u>	
	Resistance to dry heat	BS AU 148 Part 9:1969(1990) (Withdrawn) Documented In-House Methods based on customer specifications
	Immersion	BS AU 148 Part 13:1969(1990) (Withdrawn) Documented In-House Methods based on customer specifications
	Salt spray resistance	BS AU 148 Part 2:1969(1990) (Withdrawn) ASTM B117-07
	Resistance to Humidity (continuous condensation) (cyclic condensation)	BS EN ISO 6270-1:2001 BS 3900:Part F9:2001 BS 3900:Part F2:1973
	<u>Mechanical Tests</u>	
	Adhesion	BS EN ISO 2409:2007 Ford EU-BI 06-1
	Hardness	BS AU 148 Part 6:1969(1990) (Withdrawn) Clause 3 Pencil method Ford EU-BI 51-1



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PLASTIC COATINGS	<u>Corrosion Tests</u> Salt spray resistance	ASTM B117-07
END		