


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 <p>0256</p> <p>Accredited to ISO/IEC 17025:2005</p>	<h3>Doosan Power Systems Limited</h3> <p>Issue No: 037 Issue date: 13 February 2012</p>	
	<p>Doosan Power Systems Ltd Porterfield Road Renfrew Scotland PA4 8DJ</p>	<p>Contact: Mr W McGovern Tel: +44 (0)141 885 3616 Fax: +44 (0)141 885 3700 E-Mail: bill.mcgovern@doosan.com Website: www.doosanpowersystems.com</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 Doosan Power Systems Ltd Porterfield Road Renfrew Scotland PA4 8DJ</p> <p>Local contact Mr W McGovern Tel: +44 (0)141 885 3616 Fax: +44 (0)141 885 3700 Email: bill.mcgovern@doosan.com Website: www.doosanpowersystems.com</p>	<p>Fuels - Chemical and Physical Tests Metals and Weldments - Chemical Tests Metals and Weldments - Mechanical Tests Metals and Weldments - Metallurgical Tests Metals and Weldments - NDT Tests</p>	A

Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>Premises including commercial and industrial</p>	<p>Metals and Weldments - NDT Testing</p>	B



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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
COAL, COKE, ASH, GRIT or DUST and BOILER DEPOSITS	<u>Sample Preparation/Tests</u> Loss of moisture on air drying (including sample preparation to particle size smaller than 212 µm and 2.8 mm)	Documented In-House Method WI-500-01-202 based on BS ISO 13909-1	A
COAL AND SOLID FUELS	<u>Chemical Tests</u>	Documented In-House Methods based on British Standards:	
	Proximate analysis	WI-500-01-211 BS 1016:Part 104:1999 BS ISO 562:2010 BS ISO 1171:2010	A
	Calorific value	WI-500-01-244 BS ISO 1928:2009	A
	Ultimate analysis	WI-500-01-212 BS 1016:Part 106.1.1:1996 BS 1016:Part 106.2:1997 BS 1016:Part 106.4.2:1996 ASTM D4208:2007	A
	Sulphur	WI-500-01-213 BS 1016:Part 106.4.2:1996	A
	Chlorine	WI-500-01-213 ASTM D4208:2007	A
	Carbon	WI-500-01-248 BS 1016:Part 106.1.1:1996	A
	Hydrogen	WI-500-01-248 BS 1016:Part 106.1.1:1996	A
	Nitrogen	WI-500-01-252 BS 1016:Part 106.2:1997	A
	Ash Fusibility	WI-500-01-218 BS ISO 540:2008	A



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COAL AND SOLID FUELS (cont'd)	<u>Physical Tests</u>	Documented In-House Methods based on British Standards:	
	Coal Ash Oxides: Al ₂ O ₃ CaO Fe ₂ O ₃ K ₂ O MgO Na ₂ O SiO ₂ TiO ₂ P ₂ O ₅ SO ₃	WI-500-01-257	A
	Size analysis	WI-500-01-203 WI-500-01-254 BS 1016:Part 109:1995	A
	Hardgrove index	WI-500-01-216 BS 1016:Part 112:1995	A
METALS, ALLOYS AND METAL PRODUCTS	<u>Chemical Tests</u>	Documented In-House Methods:	
Iron, steel and other ferrous alloys	Aluminium (total) Arsenic Boron Carbon Chromium Cobalt Copper Manganese Molybdenum Nickel Niobium Phosphorus Silicon Sulphur Tin Titanium Vanadium	WI-500-07-122 using Direct Reading Emission Spectrometry	A



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METALS, ALLOYS AND METAL PRODUCTS (cont'd)	<u>Chemical Tests</u> (cont'd)	Documented In-House Methods:	
Iron, steel and other ferrous alloys (cont'd)	Chromium Cobalt Copper Manganese Molybdenum Nickel Titanium Vanadium	WI-500-07-113 using ICP-OES	A
	Silicon Phosphorus	WI-500-07-114 using ICP-OES WI-500-07-115 using classical wet chemical techniques	A
	Carbon Sulphur	WI-500-07-110 using Combustion and Infra-Red Detection	A
	Nitrogen	WI-500-07-120 using Thermal Dissociation and Thermal Conductivity	A
	Oxygen	WI-500-07-120 using Reduction with Graphite and Infra-Red Analysis for CO ₂	A
	Chromium	WI-500-07-130 using classical wet chemical techniques	A
	Silicon	WI-500-07-131 using classical wet chemical techniques	A
Nickel based alloys	Chromium	WI-500-07-130 using classical wet chemical technique	A
	Silicon	WI-500-07-131 using classical wet chemical technique	A
	Carbon Sulphur	WI-500-07-110 using combustion and infra-red detection	A
	Phosphorus	WI-500-07-115 using classical wet chemistry techniques	A
Electrode Coatings and Fluxes	Moisture	WI-500-07-108	A



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METALS, ALLOYS AND METAL PRODUCTS (cont'd)	<u>Mechanical and Physical Tests</u>		
Iron, steel and other ferrous alloys (cont'd)	Brinell Hardness	BS EN ISO 6506-1:2005 ASTM E10-10 ASTM A370-11	A
	Vickers Hardness HV30, HV10, HV 5, HV 1, HV 0.5 and HV 0.3	BS EN ISO 6507-1:2005 ASTM E384-11 ASTM A370-11	A
	Rockwell Hardness B and C	BS EN ISO 6508-1:2005 ASTM E18-08b ASTM A370-11	A
	Tensile testing:		
	Ambient Temperature (Load up to 1200 kN)	BS EN ISO 6892-1:2009 ASTM E8/E8M-09 ASTM A370-11	A
	Elevated Temperature (load up to 200 kN) (up to 973 K)	BS EN ISO 6892:2011 ASTM E21-09 ASTM A370-11	A
	Impact testing:		
	Charpy (77K - 393K)	BS EN ISO 148-1:2010 ASTM E23-07a ASTM A370-11	A
	Bend	BS EN 10216-2:2002 BS EN 10217-2:2002 BS EN ISO 7438:2005 ASTM E290-09 ASTM A370-11	A
	Tube - Drift Expanding test	BS EN ISO 8493:2004 ASTM A370-11	A
	Tube - Flattening test	BS EN ISO 8492:2004 ASTM A370-11	
	<u>Metallurgical Tests</u>		
	Metallographic replication assessment for microstructure and creep damage	Documented In-House Method WI-30-00-208	A



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METALS, ALLOYS AND METAL PRODUCTS (cont'd) Weldments	<u>Mechanical and Metallurgical Tests</u> Tests designated in specific welding codes, excluding non-destructive testing - as detailed below: Visual, Impact, Tensile, Bend, Hardness, Fracture, Macroscopic and Microscopic Examination	BS EN ISO 9016:2011 BS EN ISO 5178:2011 BS EN ISO 4136:2011 BS EN ISO 5173:2010 BS EN ISO 17637:2011 BS EN ISO 9015-1:2011 BS EN 1320:1997 BS EN 1321:1997 BS EN 287-1:2011 BS EN ISO15614-1:2004+A1:2008 BS EN 288-9:1999 ASME Section IX:2010 API 1104:20 th Edition BS 4515-1:2009 BS 4515-2:1999 AWS D1.1:2010 22 nd Edition API 6A 20 th Edition EEMUA 158:1994 BS EN ISO 15156-2:2009 NACE MR0175	A
LIGHT and DENSE METALS and ALLOYS including forgings and weldments	<u>Non-Destructive Tests</u> Automated Ultrasonic Flaw Detection examination method under the supervision of suitably qualified personnel Semi-automated Ultrasonic Flaw Detection; SMARRT-Scan system including TOFD (Time of flight diffraction) Dye Penetrant	Specific Procedures to client's requirements, based on Documented In-House Procedure TC-4201-OP Specific procedures to client's requirements based on Documented In-house procedure WI-30-04-801 Documented In-House Procedures to meet the requirements of BS and BS EN Standards as below: WI-30-04-930 BS EN 571-1:1997 BS EN 10228-2:1998 ASME Section V:Article 6:2010	A, B A, B A, B



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LIGHT and DENSE METALS and ALLOYS including forgings and weldments (cont'd)	<u>Non-Destructive Tests</u> (cont'd)	Documented In-House Procedures to meet the requirements of BS and BS EN Standards as below: (cont'd)	
	Magnetic Particle	WI-30-04-910 BS EN ISO 17638 :2009 BS EN10228-1:1999 BS EN ISO 9934-1:2001 ASME Section V:Article 7:2010	A, B
DENSE METALS Weldments and forgings	<u>Non-Destructive Tests</u>		
	Ultrasonic Flaw Detection: Manual Contact Method	WI-30-04-950 BS EN 10160:1999 BS EN 10228-3:1998 BS EN 10228-4:1999 ASME Section V:Article 5:2010 Specific Procedures to client's requirements based on Documented In-House Procedure WI-30-04-203	A, B
METALS, ALLOYS AND METAL PRODUCTS Stainless steel and nickel alloys	Elemental analysis and Positive Metal Identification (PMI)	WI-30-00-221 using Portable Niton XRF Analyser	A, B

END