Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0239

Accredited to ISO/IEC 17025:2005

Exova (UK) Ltd

Issue No: 031 **Issue date:** 03 February 2012

Holwick Road
Riverside Park
Middlesbrough
TS2 1QS

Contact: Mr I Farquharson
Tel: +44 (0)1642 250336
Fax: +44 (0)1642 250337
E-Mail: ian.farquharson@exova.com
Website: www.exova.com

Testing performed at the above address only

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>Mechanical Tests</u>	
	Bend tests	BS EN ISO 7438:2005
	Fracture toughness:	
	CTOD (Temperature range: - 40 °C to ambient)	BS 7448:Part 1:1991 (Partially replaced)
	Hardness:	
	Brinell (HBW 10/3000 and 2.5/3000)	BS EN ISO 6506-1:2005 ASTM E10-10
	Rockwell (B & C Scales)	BS EN ISO 6508-1:2005 ASTM E18-08b
	Vickers (HV5, 10 & 30)	BS EN ISO 6507-1:2005 ASTM E384-10
	Impact:	
	Charpy (U & V Notch) (Temperature range: - 196 °C to 100 °C)	BS EN ISO 148-1:2010 ASTM E23-07a
	Crystallinity/Shear	BS EN ISO 148-1:2010 BS 131:Part 5:1965:(1996) ASTM E23-07a
	Izod	BS 131:Part 1:1961(1989)

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Mechanical Tests (cont'd)	
	Tensile Test:	
	Forces 2 kN up to 1000 kN Ambient temperature	BS EN ISO 6892-1:2009 BS EN 2002-1:2005 BS 4A.4:Part 1:1966 ASTM A370-11 ASTM E8/E8M-09
	Forces 1 kN up to 200 kN Temperature range 60°C to 600°C	BS EN ISO 6892-2:2011 ASTM E21-09
	Through thickness tensile	BS EN 10164:2004 ASTM A770/A770M-03
Pipe and Pipeline Components	Ring flattening tests (Forces up to 1000 kN)	BS EN ISO 8492:2004 ASTM A106/A106M-10 ASTM A370-11 ASTM A530/A530M-04a
	Ring flaring tests	ASTM A370-11
Weldments	Bend, CTOD, fracture, hardness, impact, tensile micro and macro-examination, in accordance with specified welding codes	BS EN 287:Part 1:2004 BS EN 288:Part 9:1999 BS EN ISO 9016:2011 BS EN ISO 5178:2011 BS EN ISO 4136:2011 BS EN ISO 5173:2010 BS EN ISO 9015-1:2011 BS EN 1320:1997 BS EN 1321:1997 BS EN ISO 9606-2:2004 BS EN ISO 15614-1:2004+A!:2008 BS EN ISO 15614-2:2005 BS 4871:Part 3:1985 BS 4872:Part 1:1982 BS 4872:Part 2:1976 BS 4515-1:2004 BS 4515-2:1999 BS 7448:Part 2:1997 (Withdrawn) PD 5500:2009 ASME IX-10 AWS D1.1/D1.1M-2010 ASME B31.3-2010 API 1104 (20th Edition) API 5L (44th Edition) API 6A (20th Edition) DNV-OS-F101 2010

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Metallurgical Tests</u>	
Ferrous and Non-Ferrous Products	Microstructural Examination	Documented In-House Method MET 02-2 & -3
	Grain size	ASTM E112-96 (2004) (Comparison method)
	Austenite Spacing	DNV-RP-F112 Section 7 (October 2008)
	Inclusion counting	ASTM E45-11
	Volume fraction	ASTM E562-08
	CTOD HAZ validation	EEMUA158:1994 BS 7448-2:1997(Withdrawn)
	<u>Chemical Analysis</u>	
Metals and alloys	Elemental analysis Selected by variable detection array	Documented In-House Method TL/CHEM 03 using ICP spectroscopy
Carbon & Low Alloy Steels and Stainless Steels.	Elemental Analysis	Documented In-House Method TL/CHEM 02 using Spark Source Optical Emission Spectroscopy
Carbon and Low Alloy Steels, Stainless Steels, Austenitic Steels and Ferritic Steels, Cast Irons, Silicon-Iron and Titanium Alloys	Carbon and Sulphur content	Documented In-House Method TL/CHEM 04 using combustion techniques
Aluminium Alloys, Cast Irons, Carbon & Low Alloy Steels, Cobalt Alloys, Copper Alloys, Stainless Steels, Solders and Titanium Alloys	Elemental Analysis	Documented in-House Method CHEM/12 using X-ray fluorescence techniques
Iron, Steel, Stainless Steel and other Ferrous Metals, Nickel Alloys, Cobalt Alloys and Titanium Alloys	Oxygen and Nitrogen content	ASTM E1447-09 Documented In-House Methods CHEM13 using Inert Gas Fusion techniques
Titanium alloys	Hydrogen content	Documented In-House Method CHEM14 using combustion techniques

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Chemical Analysis (cont'd)	
Iron, Steel, Stainless Steel and other ferrous materials	Residual Hydrogen content	Documented In-house method TL/CHEM 15 using Vacuum Hot Extraction
	Corrosion Tests	
Austenitic Stainless Steels	Pitting corrosion	BS 4515-2:1999 ASTM G48-03 (Method A) TWI procedure 5632/19/93
Stainless Steels	Susceptibility to inter-granular corrosion	ASTM A262-10 Practices E
Nickel based alloys	Susceptibility to inter-granular corrosion	ASTM G28-02(2008) Method A
	END	