Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

0038

Accredited to ISO/IEC 17025:2017

Element Materials Technology Aerospace UK Limited, Trading as Element Materials Technology

Issue No: 066 **Issue date:** 12 November 2021

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Testing performed by the Organisation at the locations specified below

Locations covered by the organisation and their relevant activities

Element Materials Technology Aerospace UK Limited, location code LAN, is accredited for a flexible scope that enables them to establish new and amended test methods, modification of existing methods and include newly revised or technically equivalent methods to conduct the activities detailed below, in accordance with their documented in-house procedure EX-AE-QU-X -LA-SOP 27020.

Element Materials Technology Aerospace UK Limited, location code MID, is accredited for a limited flexible scope that enables them to conduct accredited testing through the modification of existing test methods, include newly revised and technically equivalent methods and the addition of new matrices for chemistry testing to activities detailed below, in accordance with their documented in-house procedure E-E-QU-EE-X-TS-SOP001.

0038 Accredited to ISO/IEC 17025:2017	**Schedule of Accreditation** **issued by** **United Kingdom Accreditation Service** 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK **Element Materials Technology Aerospace UK Limited, Trading as Element Materials Technology** **Issue No:** 066 **Issue date:** 12 November2021

Testing performed by the Organisation at the locations specified

Laboratory locations:

LAN: Element Materials Technology Aerospace UK Limited, Trading as Element Materials Technology Lancaster
MID: Element Materials Technology Aerospace UK Limited, Trading as Element Materials Technology Teesside

Location details		Activity	Location code
Address Crosslands House White Cross South Road Lancaster LA1 4XQ	**Local contact** Mr. Rafael Leon Tel: +44(0)1524 841070 Fax: +44(0)1524 62983 Email: rafael.leon@element.com Website: www.element.com	Metals & Weldments - Mechanical tests Plastics and Composites – Mechanical tests & Physical Properties	LAN
Address Holwick Road Riverside park Middlesbrough TS2 1QS	**Local contact** Mr. Alan Gale Tel: +44(0)1642 250336 Fax: +44(0)1642 250337 Email: alan.gale@element.com Website: www.element.com	Metals & Weldments - Corrosion tests Metals & Weldments - Mechanical tests Metals & Weldments - Metallurgical tests Metals & Weldments – Elemental analysis	MID

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS	<u>Mechanical Tests</u> <u>Fatigue:</u>		
Iron, Steel, Stainless Steel and other ferrous materials, Nickel, Titanium, and other non-ferrous materials	Low and high cycle, tensile/compressive and complex waveforms with: (a) Force control (b) Strain control (c) Displacement control (Temperature range -196°C and -100°C to 1150°C) (Forces up to ± 400 kN)	BS 3518-1 BS 3518-3 BS EN 6072 BS 7270 BS EN 3987 prEN 3874 (April 1988) prEN 3988 P1 (April 1998) ISO 1099 ASTM D3479/3479M ASTM E466 ASTM E606/E606M Documented In-House Method developed using procedure EX-AE-QU-X-LA-SOP 27020	LAN
	Rotating bending	BS ISO 1143 Documented In-House Method developed using procedure EX-AE-QU-X-LA-SOP 27020	LAN
	Fatigue crack growth rate and threshold determination	BS EN 3873 BS ISO 12108 ASTM E647 Documented In-House Method developed using procedure EX-AE-QU-X-LA-SOP 27020	LAN
	<u>Fracture Toughness:</u>		
Iron, Steel, Stainless Steel and other ferrous materials, Nickel, Titanium, and other non-ferrous materials	K_{Ic} (Temperature range -196°C and -100°C to 1150°C)	BS 7448-1 BS 7448-2 (Withdrawn) BS EN ISO 12737 BS EN ISO 15653 ASTM B645 ASTM E399 ASTM E740M	LAN
	K_{As}	ASTM E561 BMS 7-323D	LAN

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Mechanical Tests (cont'd)		
	Fracture Toughness: (cont'd)		
Iron, Steel, Stainless Steel and other ferrous materials, Aluminium, Nickel, Titanium, and other non-ferrous materials	R-Curve	ASTM E561	LAN
	CTOD (Temperature range: - 40 °C to ambient)	BS 7448-1:1991 (Partially replaced) BS 7448-2:1997 (Withdrawn) BS EN ISO 15653 ISO 12135	MID
	Impact:		
	Charpy (U & V Notch) (Temperature range: - 196 °C to 100 °C)	ASTM E23 ASTM A370 ASTM A923 (Method B) BS EN ISO 148-1	MID
	Shear	BS EN ISO 148-1 ASTM E23	MID
	Bend :		
	Bend Test	BS EN ISO 7438	MID

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Mechanical Tests (cont'd)		
	Hardness:		
Iron, Steel, Stainless Steel and other ferrous materials, Nickel, Titanium, and other non-ferrous materials	Brinell (HBW 10/3000)	BS EN ISO 6506-1 ASTM E10	MID
	Rockwell (B & C Scales)	BS EN ISO 6508-1 ASTM E18	MID
	Vickers (HV5, HV10 & HV30)	BS EN ISO 6507-1 ASTM E92	MID
	Proof loading:		
Bearings and bushes	Proof Loading (Forces up to ± 400kN)	Documented In-House Method developed using procedure EX-AE-QU-X-LA-SOP 27020Documented In-House Method EX-E-OP-FE-LA-MD26980	LAN
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Mechanical Tests (cont'd)		
	Tensile:		
Iron, Steel, Stainless Steel and other ferrous materials, Nickel, Titanium, and other non-ferrous materials	Forces 2 kN up to 1000 kN Ambient temperature	BS EN ISO 6892-1 BS EN 2002-1 BS 4A.4:Part 1 ASTM A370 ASTM E8/E8M	MID
	Forces 1 kN up to 200 kN Temperature range 60°C to 650°C	BS EN ISO 6892-2 ASTM E21	MID
	Through thickness tensile	BS EN 10164 ASTM A770/A770M	MID
Pipe and Pipeline Components	Ring flattening tests (Forces up to 1000 kN)	BS EN ISO 8492 ASTM A106/A106M Clause 12 ASTM A370 ASTM A530/A530M Clause 21	MID
	Ring flaring tests	ASTM A370	MID

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Metallurgical Tests</u>		
Iron, Steel, Stainless Steel and other ferrous materials, Nickel, Titanium, and other non-ferrous materials	Microstructural Examination	Documented In-House Method EX-G-OP-MET-X-MD 25217	MID
	Macrostructure / Microstructure	API STD 6ACRA	MID
	Inclusion counting	ASTM E45	MID
	Volume fraction	ASTM E562	MID
Duplex stainless steels	Detecting detrimental Intermetallic phases	ASTM A923 (Method A)	MID
	Austenite Spacing	DNV-RP-F112 Section 7	MID
	CTOD HAZ validation	EEMUA 158:3rd Edition BS 7448-2:1997(Withdrawn) BS EN ISO 15653	MID
	Grain size (Comparison method and Intercept method)	ASTM E112	MID
METALS, ALLOYS and METAL PRODUCTS (cont'd)	<u>Corrosion Tests</u>		
Austenitic Stainless Steels	Pitting corrosion	BS 4515-2 (Annex C) ASTM G48 (Method A)	MID
Stainless Steels	Susceptibility to inter-granular corrosion	ASTM A262 Practices A & E	MID
Duplex Stainless steels	Detecting detrimental Intermetallic phases	ASTM A923 (Method C)	MID
Nickel based alloys	Susceptibility to inter-granular corrosion	ASTM G28 Method A	MID

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS (cont'd)			
Weldments (cont'd)	Bend, CTOD, fracture, hardness, impact, tensile micro and macro-examination, in accordance with specified welding codes	BS EN 287-1 BS EN 288-9:1999(Withdrawn) BS 4515-1 BS 4515-2 BS 4871-3 (Withdrawn) BS 4872-1 BS 4872-2 BS EN ISO 9606-1 BS EN ISO 9606-2 BS EN ISO 15614-1 BS EN ISO 15614-2 BS EN ISO 4136 BS EN ISO 5173 BS EN ISO 5178 BS EN ISO 9015-1 BS EN ISO 9016 BS EN ISO 9017 BS EN ISO 17639 PD 5500 ASME BPVC IX AWS D1.1/D1.1M ASME B31.3 API 1104 API 5L API 6A DNV-OS-F101	MID

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Elemental Analysis		
Metals and alloys	Elemental analysis Selected by variable detection array	Documented In-House Method TL/CHEM 03B using ICAP ICP	MID
Aluminium Alloys	B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, Ga, In, K, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, V, Zn & Zr	Documented In-House Method TL/CHEM03B-1 using ICP-OES	MID
Titanium Alloys	Al, B, Bi, Co, Cr, Cu, Fe, Mn, Mo, Nb, Ni, Si, Sn, Ta, V, W, Y, Zn & Zr	Documented In-House Method TL/CHEM03B-8 and TL/CHEM03C-8 using ICP-OES	MID
Cobalt Alloys	Al, B, Cr, Cu, Fe, Mn, Mo, Nb, Ni, P, Si, Ti, V, W & Zr	Documented In-House Method TL/CHEM03B-22 using ICP-OES	MID
Copper Alloys	Ag, As, Al, B, Be, Bi, Cd, Co, Cr, Fe, In, Mg, Mn, Ni, P, Pb, Sb, Se, Si, Sn, Te, Ti, Zn & Zr	Documented In-House Method TL/CHEM03B-5 using ICP-OES	MID
Carbon & Low Alloy Steels, Tool Steels, Cast Iron	As, Al, B, Bi, Ca, Cd, Ce, Co, Cr, Cu, La, Mg, Mn, Mo, Nb, Ni, P, Pb, Sb, Se, Si, Sn, Ta, Te, Ti, V, W, Zn & Zr	Documented In-House Method TL/CHEM03B-2 using ICP-OES	MID
Stainless Steels	Al, B, Ca, Cd, Ce, Co, Cr, Cu, La, Mg, Mn, Mo, Nb, Ni, P, Si, Sn, Ta, Te, Ti, V, W, Zn & Zr	Documented In-House Method TL/CHEM03B-2 using ICP-OES	MID
Nickel Alloys	Al, B, Bi, Ca, Co, Cr, Cu, Fe, Hf, Mg, Mn, Mo, Nb, Ni, P, Pb, Si, Sn, Ta, Ti, V, W, Zn & Zr	Documented In-House Method TL/CHEM03B-4 using ICP-OES	MID
Tin Alloys	As, Al, Bi, Cd,Co,Cu, Fe, Ga, Ge, Hg, In, Ni, P, Pb, Sb, Se, Ti, & Zn	Documented In-House Method TL/CHEM03B-15 using ICP-OES	MID
Zinc Alloys	As, Al, B, Be, Bi, Cd, Ce, Co, Cr, Cu, Fe, Hg, In, Mg, Mn, Ni, P, Pb, Sb, Si, Sn, Ti, Tl, Zn & Zr	Documented In-House Method TL/CHEM03B-6 using ICP-OES	MID

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
METALS, ALLOYS and METAL PRODUCTS (cont'd)	Elemental Analysis (cont'd)		
Carbon & Low Alloy Steels	Al, B, C, Ca, Co, Cr, Cu, Mn, Mo, Nb, Ni, P, S, Si, Sn, Ta, Ti, V, W & Zr	Documented In-House Method TL/CHEM 02 using Spark OES	MID
Stainless Steels	Al, B, C, Co, Cr. Cu, Mn, Mo, Nb, Ni, P, S, Si, Sn, Ta, Ti, V & W	Documented In-House Method TL/CHEM 02 using Spark OES	MID
Cast Irons	Al, Ce, Cr, Cu, Mn, Mo, Ni, P, Si, Ti & V	Documented in-House Method TL CHEM/16 using XRF	MID
Nickel Alloys	Al, Co, Cr, Cu, Fe, Mn, Mo, Nb, P, Si, Ta, Ti, V, W & Zr	Documented in-House Method TL CHEM/16 using XRF	MID
Titanium Alloys	Al, Co, Cr, Cu, Fe, Mn, Mo, Nb, Ni, Pd, Ru, Si, Sn, Ta, V, W, Zr & Y	Documented in-House Method TL CHEM/16 using XRF	MID
Titanium Aluminide Alloys	Al, Co, Cr, Cu, Fe, Hf, Mn, Mo, Nb, Ni, Si, Sn, Ta, V, W, Zr & Y	Documented in-House Method TL CHEM/16 using XRF	MID
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	MID
Iron, Steel, Stainless Steel and other Ferrous Metals, Nickel Alloys, Cobalt Alloys and Titanium Alloys	Oxygen and Nitrogen content	ASTM E1447 Documented In-House Method TL/CHEM13A (Eltra ONH-2000) and TL/CHEM13B (LECO TC-400) using Inert Gas Fusion techniques	MID
Titanium alloys	Hydrogen content	Documented In-House Method TL/CHEM14B using Inert Gas Fusion techniques	MID
Iron, Steel, Stainless Steel, Nickeland other ferrous materials	Hydrogen content	Documented In-house method TL/CHEM 18 using Inert Gas Fusion Technique	MID

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
PLASTICS, including Rigid and Reinforced Plastics and COMPOSITES	Mechanical Tests (Temperature range -65°C to 300°C (uncontrolled relative humidity) Low Cycle Fatigue	 ASTM D3479/D3479M Documented In-House Method EX-AE-QU-X-LA-SOP-27020	 LAN
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