SINGAPORE LABORATORY ACCREDITATION SCHEME

Accredited Laboratory SAC-SINGLAS

Schedule

Singapore Test Services Pte Ltd
249 Jalan Boon Lay
Singapore 619523

Certificate No. : LA-1991-0040-G

Issue No. : 25

Date : 19 September 2018

FIELD OF TESTING : Mechanical Testing

MATERIALS / PRODUCTS TESTED	TESTS / PROPERTIES	STANDARD METHODS / TECHNIQUES
A. METALS & METAL PRODUCTS		
A1. Metal & Metal Products	1. Tensile Test	) ASTM A370-17) ASTM B557-15
	a Tensile Strength	) ASTM B557M-15) ASTM E8 / E8M-16a
	b Yield Stress / Proof Stress	) ASTM E111-17) JIS Z 2201-1998
	c Elongation	) JIS Z 2241-2011) BS EN ISO 6892-1 : 2016
	d Reduction in Area	))
	e Modulus of Elasticity	) SS 456 : 1999) CAAS SAR Chapter 6.5 Appendix I (2017)
	2. Compression Strength	ASTM E9-09
	3. Shear Test	ASTM B565-04 (2015)
	4. Impact Test	) ASTM E23-16b
	a Charpy V-notch	) ASTM A370-17
	b Charpy U-notch	) BS EN ISO 148-1-2016
	c Izod Impact	)

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MATERIALS / PRODUCTS TESTED	TESTS / PROPERTIES	STANDARD METHODS / TECHNIQUES
	5. Bend Test	
	a Roller Bend Test	ASTM E190-14 (CAAS SAR Chapter 6.5 Appendix I (2017)
	6. Hardness Test	
	a Vickers Hardness	ASTM E384-11^{E1} BS EN ISO 6507-1-2005
	b Brinell Hardnes	ASTM E10-17 BS EN ISO 6506-1-2014
	c Rockwell Hardness	ASTM E18-17E1 BS EN ISO 6508-1:2016
	d Microindentation Hardness	ASTM E384-17
	7. Metallurgical Examination	
	a Preparation of Metallographic Samples	ASTM E3-11 (2017)
	b Microetching of Metals & Alloys	ASTM E407-07 ^{e1} CAAS SAR Chapter 6.5 Appendix I (2017)
	c Macroetching of Metals & Alloys	ASTM E340-15 BS EN ISO 17639:2013
	d Determination of Average Grain Size	ASTM E112-13
	e Microstructure of Graphite in Iron Casting	ASTM A247-17
	f Volume Fraction by Systematic Manual Point Count	ASTM E562-11
	g Determining the Inclusion Content of Steel	ASTM E45-13*

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	h Susceptability to Intergranular Attack in Austenitic Stainless Steel	ASTM A262-15
	i Pitting & Crevice Corrosion Resistance of Stainless Steel Related Alloys by use of Ferric Chloride Solutions	ASTM G48-11 (2015) Method A @ 20 °C
	8. Coating Thickness a Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross-section	ASTM B487-85 (2013) *
A2. Reinforcement Bar	1 Tensile Test (Uniform & Variable Cross- Sectional Area) 2 Bend/re-bend Test	) BS 4449-1997) BS 4449-2005 + A3 : 2016) SS 2 : Part 1 : 1999) SS 2 : Part 2 : 1999) SS 2 : Part 3 : 1987) SS 427 : 1998) SS 456 : 1999
A3. Steel Wire	1. Tensile Test	SS 18 : Part 1 : 1999 SS 18 : Part 2 : 1970
A4. Welded Structures / Plates / Pipes	1. Tensile Test 2. Bend Test 3. Nick Break Test / Fracture Test 4. Macroexamination of Welds 5. Microexamination of Metals	) ASME Sec. IX, 2017) AWS D1.1 / D1.1M : 2015) API 1104, 21st ed. 2013) ASTM E190-14) CAAS SAR Chapter 6.5 Appendix I (2017)
A5. Reinforcement Bar with Coupler	1. Slip Test of Reinforcement Bar 2. Tension Load Test of Reinforcement Bar	) SS 2 : Part 3 : 1987) BS 8110-1 : 1997)

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A6. Welded Steel Fabric	1. Tensile Test	) SS 32 : Part 1 : 1999
		) SS 32 : Part 2 : 1986
	2. Bend Test	) SS 18 : Part 1 : 1999
		) SS 18 : Part 2 : 1970
	3. Weld Shear Test	
B. Metal Scaffolds		
B1. Frame Scaffolding	1. Dimensional Measurement	) SS 280-1 : 2006
		)
	2. 3 Bay x 3 Lift Frame Scaffolding System	)
	a. Stiffness Test – Annex A1	)
	b. Strength Test – Annex A2	)
		)
	3. 1 bay x 3 Lift Set-up (Lateral Load Test)	)
	a. Stiffness Test – Annex B1	)
	b. Strength Test – Annex B2	)
		)
	4. Vertical Frame (Horizontal Member of Frame)	)
	a. Load Test on Horizontal Tubes- Annex C1	)
	b. Compressive Test on Vertical Tubes (Standard or Leg) – Annex C2	)
		)
	5. Cross Brace	)
	a. Load Test – Appendix D	)
		)
	6. Horizontal Frame	)
	a. Deflection and Bending Test – Annex E1	)
	b. Load Test on Clamp (Hook)-Annex E2	)
		)
	7. Treadboard (Catwalk)	)
	a. Deflection and Bending Test – Annex F1	)
	b. Load Test on Clamp – Annex F2	)
	c. Deflection and “Punching” Test on Expanded Metal – Annex F3	)
	8. Adjustable Base Plate (Jack Base)	) SS 280-1 : 2006
	a. Load Test – Annex G	)
		)

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	9. Arm Lock	)
	a. Load Test – Annex H	)
		)
	10. Wall Tie	)
	a. Tensile Test – Annex I.1	)
	b. Compression Test – Annex I.2	)
		)
	11. Cantilever Bracket	)
	a. Load Test – Annex J	)
		)
	12. Cross Brace Pin	)
	a. Load Test – Annex K	)
	13. Material Test	JIS Z 2241-2011
	a. Tensile Test	
B2. Modular Scaffolding	1. Dimensional Measurement	) SS 280-2 : 2009
		)
	2. 3 Bay x 3 Lift Modular Scaffolding System	)
	a. Stiffness Test – Annex A1	)
	b. Strength Test – Annex A2	)
		)
	3. 1 Bay x 3 Lift Set-up (Lateral Load Test)	)
	a. Stiffness Test – Annex B1	)
	b. Strength Test – Annex B2	)
		)
	4. Adjustable Base Plate	)
	a. Load Test – Annex C	)
		)
	5. Node of Vertical Standard	)
	a. Load Test – Annex D	)
		)
	6. Metal Decking	)
	a. Deflection and Bending Testing – Annex E1	)
	b. Load Test on Gripper Fittings (hooks) - Annex – E2	)
	c. Deflection and “Punching” Test on Expanded Metal – Annex E3	)
	7. Wall Tie	)
	a. Tensile Test – Annex F.1	)
	b. Compression Test – Annex F.2	)

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	8. Material Test a. Tensile Test	) BS EN ISO 6892-1:2016) JIS Z 2241-2011) SS 456 : 1999
B3. Steel Tubes and Fittings Used in Tubular Scaffoldings	1. Right-Angle Couplers a. Slip Test – Appendix C1 b. Maximum Load Test – Appendix C2 2. Swivel Couplers a. Slip Test – Appendix D1 b. Maximum Load Test – Annex D2 3. End-To-End Couplers a. Load Test – Appendix E 4. Dimensional Measurement of Tube 5. Material Test of Tube a. Flattening Test b. Tensile Test	) SS 311 : 2005))))))))))))) SS 311 : 2005) BS EN ISO 6892-1 : 2016) JIS Z 2241-2011) SS 456 : 1999
B4. Life Line	1. Tension Breaking Load test	ASTM D4268 - 93
C. Piping Valves & Containers	1. Hydrostatic Leak Testing	ASTM E1003-13

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MATERIALS / PRODUCTS TESTED	TESTS / PROPERTIES	STANDARD METHODS / TECHNIQUES
D. Plastic & Plastic Products		
1. Plastics - General	1. Tensile Strength	) ASTM D638-14 (except nominal strain)) BS EN ISO 527-1, -2 : 2012
	2. Flexural Properties (3-point Method)	) ASTM D790-17) BS EN ISO 178-1 : 2010 + A1:2013
E. Rubber & Rubber Product		
1. Rubber / Rubber Product	1. Tensile Test 2. Compression Test (Method A only) 3. Hardness Test (Shore A and D) 4. Compression Set Test (Method B only)	ASTM D412-16 ASTM D575-91 (2012) ASTM D2240-15E1 ASTM D395-16^{E1}
F. Composites		
1. Composites-General	1. Tensile Test	) ASTM D638-14 (except nominal strain)) ASTM D3039/ D3039M-17) ISO 527 : 4 : 1997) ISO 527 : 5 : 2009) BS 2782 : Part 10: Method 1003-1977
	2. Flexural Properties (3-point Method)	) ASTM D790-17) BS 2782 : Part 10: Method 1005-1977
	3. Short Beam Strength	) ASTM D2344/D2344M-16) BS EN ISO 14130:1998

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Approved signatories

Michael Chew Hai Chong	-	Section A1.6d - A1.8
Tan Chee Kheng	-	Section A (exclude A1.6d - A1.8 & A7), B and C
Khoo Chee Guan, Mark	-	Section A1 (excluding A1.6d - A1.8), A7, C, D, E and F
Yong Soon Choy	-	Section A (excluding A1.6d - A1.8 and A7), B1 and B2 (excluding B1.1 - B1.3 and B2.1 - B2.3), D, E and F
Lim Bing Cong	-	Section A1.6d - A1.8
Teo Cheng Kiat Andrew	-	Section A1.1, A1.4 & A1.6 (excluding A1.6d), D, E and F
Joe Han York Kwang	-	Section A1.6 – A1.8
Chua Xin Pei	-	Section A 1.6d - A1.8
Alexis Yee Pei En	-	Section A 1.6d – A1.8

Note :

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005. A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results. The **management system requirements** in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 **Quality Management Systems — Requirements** and are aligned with its pertinent requirements.