

Schedule

Element Construction Testing (S) Pte Ltd
58 Sungei Kadut Loop
Singapore 729501

Certificate No. : LA-2010-0461-A
Issue No. : 18
Date : 29 December 2023
Expiry of Certificate : 26 May 2025
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FIELD OF TESTING : Chemical and Biological Testing

MATERIALS / PRODUCTS TESTED	TESTS / PROPERTIES	STANDARD METHODS / TECHNIQUES / EQUIPMENT
A Aggregates	1. Chloride Content	SS 73: Part 17: 1992 BS 812: Part 117: 1988 BS EN 1744-1: 2009 + A1: 2012 (Clause 7) BS EN 1744-5: 2006
	2. Sulfate Content	SS 73: Part 18: 1992 BS 812: Part 118: 1988 BS EN 1744-1: 2009 + A1: 2012 (Clause 10, 12)
	3. Potential Alkali Silica Reactivity (Chemical Method)	ASTM C289: 2007
	4. Lightweight Organic Contaminator	BS EN 1744-1: 2009 + A1: 2012 (Clause 14.2)
	5. Humus Content	BS EN 1744-1: 2009 + A1: 2012 (Clause 15.1)
	6. Fulvo Acid	BS EN 1744-1: 2009 + A1: 2012 (Clause 15.2)
	7. Loss on Ignition	BS EN 1744-1: 2009 + A1: 2012 (Clause 17)
	8. Fixed Water Content by Ignition Test	ASTM C637-20, Clause 9.1.3.1
	9. Total Sulfur Content	BS EN 1744-1: 2009 + A1: 2012, Clause 11

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B1 Cement, Silica Fume, Ground Granulated Blast Furnace Slag	10. Water Soluble Chloride Salts using the Mohr Method	BS EN 1744-1: 2009 + A1: 2012, Clause 9
	11. Organic Impurities	ASTM C40 / C40M-20 SS 73: 1974
	1. Loss of Ignition	} BS EN 196-2: 2013 SS 397: Part 2: 1997
	2. Sulfate	
	3. Residual Insoluble	} BS EN 196-2: 2013 SS 397: Part 2: 1997
	4. Manganese	
	5. Silica	
	6. Iron (III) Oxide	
	7. Aluminium Oxide	
	8. Calcium Oxide	
	9. Magnesium Oxide	
	10. Chloride	
	11. Alkali	
	12. Carbon Dioxide	
	13. Sulfide	
	14. Pozzolanicity	BS EN 196-5: 2011
	15. Heat of Hydration – Solution Method	BS EN 196-8: 2010
	16. Chemical Analysis by X-Ray Fluorescence	BS EN 196-2: 2013
17. Chemical Analysis of Hydraulic Cement for Specific Analytes	ASTM C114-22	
<ul style="list-style-type: none"> • Insoluble Residue • Ferric Oxide • Phosphorus Pentoxide • Titanium Dioxide • Ammonium Hydroxide Group • Magnesium Oxide • Sulfur Trioxide • Loss On Ignition • Silicon Dioxide • Aluminium Oxide • Calcium Oxide • Sodium & Potassium Oxide, Total Alkali • Chloride 		
18. Free Calcium Oxide in Cement Rapid (Sr(NO ₃) ₂) Method	ASTM C114-22, Section No. 30.3	

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B2 Cement, Fly Ash	1. Reactive Silica	BS EN 196-2: 2013 / (SS EN 197-1: 2014) (BS EN 450-1: 2012)
B3 Silica Fume	1. Specific Surface Area – BET method	ISO 9277: 2010 ASTM C1069-09 (2022)
	2. Free Calcium Oxide	BS EN 451-1: 2017
	3. Surface Silicon	ISO 9286: 2021
	4. Loss on Ignition	ASTM C311/C311M-22
B4 Fly Ash	1. Loss of Ignition	} BS EN 196-2: 2013 (BS EN 450-1: 2012)
	2. Sulfate	
	3. Residual Insoluble	
	4. Manganese	
	5. Silica	
	6. Iron (III) Oxide	
	7. Aluminium Oxide	
	8. Calcium Oxide	
	9. Magnesium Oxide	
	10. Chloride	
	11. Alkali	
	12. Free Calcium Oxide	BS EN 451-1: 2017
	13. Reactive Calcium Oxide	BS EN 197-1: 2011
	14. Soluble Phosphate (P ₂ O ₅)	BS EN 450-1: 2012 (Annex C)
	15. Loss on Ignition	ASTM C311/C311M-22
C Concrete (Hardened Concrete)	1. Chloride	BS 1881-124: 2015 + A1: 2021 BS EN 14629: 2007
	2. Sulfate	BS 1881-124: 2015 + A1: 2021
	3. Sulfide	BS 1881-124: 2015 + A1: 2021
	4. Cement Content	BS 1881-124: 2015 + A1: 2021
	5. Sodium Oxide and Potassium Oxide	BS 1881-124: 2015 + A1: 2021
	6. Silane Content by Py-GC	EL-A-OP-CH-SIN-MD505 Iss 1 July 2023

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	7. Apparent Chloride Diffusion Coefficient of Cementitious Mixtures by Bulk Diffusion	ASTM C1556-22 Nordtest Method NT BUILD 443 (Approved 1995-11)
	8. Determination of the chloride resistance of concrete, unidirectional diffusion	EN 12390-11: 2015
	9. Determining the Penetration of Chloride Ion into Concrete by Ponding	ASTM C1543-02
D Plaster / Motar / Screed	1. Mix Composition (i.e. Cement, Lime, Gypsum & Aggregate)	} BS 4551: 2005 + A2: 2013
	2. Chloride	
	3. Sulfate	
E Admixture	1. Absolute Density at 20°C	ISO 758: 1976
	2. Conventional Dry Material Content	BS EN 480-8: 2012
	3. pH Value at 20°C	ISO 4316: 1977
	4. Water Soluble Chloride	BS EN 480-10: 2009
	5. Alkali Content	BS EN 480-12: 2005
	6. Silicon Dioxide SiO ₂ Content	BS EN 196-2:2013 (procedure 4.5)
	7. Infrared Analysis	BS EN 480-6: 2005
	8. Ash Content	SS 320: 1987
	9. Homogeneity	BS EN 934-1:2008
	10. Colour	BS EN 934-1:2008
	11. Determination of Total Chlorine Content	EN ISO 1158:1998

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F Repair Material		
1 Polymer Modified Cement Mortar / Waterproofing Coating / Modified Cement Mortar / Waterproofing Coating	1. Polymer Content	EL-A-OP-CH-SIN-MD501 Iss 1 July 2023
	2. Polymer Identification	EL-A-OP-CH-SIN-MD502 Iss 1 July 2023
	3. Cement Content	BS 4551: 2005 + A2: 2013
2 Cementitious Waterproof Membrane	1. Verification of base polymer	EL-A-OP-CH-SIN-MD501 Iss 1 July 2023 EL-A-OP-CH-SIN-MD502 Iss 1 July 2023
	2. Chloride Content	EL-A-OP-CH-SIN-MD503 Iss 1 July 2023
3 Waterproofing Coating - for repair to external wall	1. Verification of base polymer	EL-A-OP-CH-SIN-MD502 Iss 1 July 2023
	2. Polymer Content	EL-A-OP-CH-SIN-MD501 Iss 1 July 2023
4 Non-Cementitious Waterproof Membrane	1. Volatile Content	EL-A-OP-CH-SIN-MD501 Iss 1 July 2023
	2. Verification of base polymer	EL-A-OP-CH-SIN-MD501 Iss 1 July 2023 EL-A-OP-CH-SIN-MD502 Iss 1 July 2023
G Building Material		
1 Prepacked Mortar	1. Polymer Content	EL-A-OP-CH-SIN-MD501 Iss 1 July 2023
2 Prepacked Skim Coat		
3 Prepacked Waterproof Screed	2. Product Identification Analysis	EL-A-OP-CH-SIN-MD502 Iss 1 July 2023
4 Tile Grout		
5 Acrylic Polymer Cementitious Coating		

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H Paint and Coating	1. Density	SS 5: Part B7: 2013(2018)+A1:2018 ASTM D1475-13 (2020)
	2. Non-Volatile Matter	SS 5: Part B2: 2013 (2018), ISO 3251: 2019, IDT ASTM D2369-20
	3. Paint Dilution Test	EL-A-OP-CH-SIN-MD504 Iss 1 July 2023
	4. Volatile Organic Compounds	ISO 11890-2: 2013 ISO 11890-1: 2007
	5. Water Content by Karl Fisher	EL-A-OP-CH-SIN-MD509 Iss 1 July 2023
	6. Determination of Low Concentrations of Mercury in Paint by Atomic Absorption Spectroscopy	SS 5: Part C4: 1988
	7. Determination of Low Concentrations of Lead, Cadmium and Cobalt in Paint by Atomic Absorption Spectroscopy	SS 5: Part C6: 1988
	8. Determination of Hexavalent Chromium (Cr(VI)) in Polymers and Electronics by the Colorimetric Method	IEC 62321-7-2: 2017
	9. FTIR Analysis	ASTM E1252-98(2021)
I Metals and Metal Products	<u>Determination of Metal Composition by Optical Emission Spectroscopy</u>	
	1. Carbon and Low Alloy Steels	ASTM E415-21 ASTM A751-21
	2. Stainless Steels	ASTM E1086-22 ASTM A751-21
J. Pesticide	1. Imidachloprid Concentration	EL-A-OP-CH-SIN-MD506 Iss 1 July 2023

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K. Mixing Water for Concrete	Suitability of Water 1. Oils and Fats 2. Detergents 3. Colour 4. Suspended Matter 5. Odour 6. Acids 7. Humic Matter 8. Chloride Content 9. Sulphate Content 10. Alkali Content	BS EN 1008: 2002
L. Soil	1. pH Value 2. Organic Matter 3. Mass Loss on Ignition 4. Water soluble sulphate in soil 5. Water Extract or Groundwater Sulfate (Ion Chromatography Method) 6. Acid or Water Extract or Groundwater Sulfate (Gravimetric Method) 7. Sulfate in Groundwater 8. Acid Soluble Sulfate 9. Carbonate Content 10. Water Soluble Chloride	BS 1377-3: 2018 + A1: 2021 Clause 12 BS 1377-3: 2018 + A1: 2021 Clause 4 BS 1377-3: 2018 + A1: 2021 Clause 6 BS 1377-3: 2018 + A1: 2021 Clause 7.3 BS 1377-3: 2018 + A1: 2021 Clause 7.4 BS 1377-3: 2018 + A1: 2021 Clause 7.6 BS 1377-3: 2018 + A1: 2021 Clause 7.8 BS 1377-3: 2018 + A1: 2021 Clause 7.9 BS 1377-3: 2018 + A1: 2021 Clause 8.2 BS 1377-3: 2018 + A1: 2021 Clause 8.3 BS 1377-3: 2018 + A1: 2021 Clause 8.4 BS 1377-3: 2018 + A1: 2021 Clause 9.2

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	11. Acid Soluble Chloride	BS 1377-3: 2018 + A1: 2021 Clause 9.3
	12. Total Dissolved Solid	BS 1377-3: 2018 + A1: 2021 Clause 11
	13. Total Organic Carbon (TOC)	BS 1377-3: 2018 + A1: 2021 Clause 5
	14. Heavy Metals (Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Pb, Sb, Se, Sn, Sr, Ti, V and Zn)	Digestion by USEPA 3051A: 2007 USPEA 3050B: 1996 Analysis by USEPA 6020B: 2014 (ICPMS) USEPA 6010D: 2018 (ICP-AES)
	15. Rapid Determination of Carbonate Content of Soils	ASTM D4373-21
	16. Determination of the specific electrical conductivity in soil	ISO 11265:1994
	17. Electrical Resistivity	BS 1377-3: 2018 + A1: 2021 Clause 13

Approved Signatories

S/N	Name	Scope
1.	Ms Sherly Wijaya	– For all accredited tests except: <ul style="list-style-type: none">• Section B3: Test 4.• Section B4: Test 13, 14, 15.• Section C: Test 9.• Section E: Test 11.• Section H: Test 6, 7, 8, 9.• Section K
2.	Ms May Soe Moe	– For all accredited tests except Section L item 16.

Note:

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A laboratory's fulfilment of the requirements of ISO/IEC 17025 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 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.