Soils & Materials Engineering Co. Ltd.
綜合試驗有限公司

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ACCREDITED TEST CATEGORIES
認可測試類別 : Calibration Services 校正服務
Construction Materials 建築材料
Environmental Testing 環境測試

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Calibration Services 校正服務

ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED@ 特定測試或量度的特性@	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Acoustic and vibration measurements		
- Acoustic measurements		
- Sound calibrator	Calibration for the following parameters using insert voltage technique in accordance with IEC 60942: 1997 Annex B	
	Sound pressure level (63 Hz to 4 kHz) at: 94 dB, 104 dB and 114 dB	0.08 dB
	Sound pressure level (above 4 kHz to 8 kHz) at: 94 dB, 104 dB and 114 dB	0.10 dB
	Sound pressure level (above 8 kHz to16 kHz) at: 94 dB, 104 dB and 114 dB	0.25 dB
	Sound pressure level stability (63 Hz to 16 kHz) over the following range : 94 dB, 104 dB and 114 dB	0.005 dB
	Frequency over the following range: 63 Hz to 16 kHz	0.1 Hz
	Total distortion (63 Hz to 16 kHz; 94 dB; 104 dB; 114 dB) over the following range: 0 % to 5 %	0.7 %

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Acoustic and vibration measurements (cont'd)		
- Acoustic measurements (cont'd)		
- Sound calibrator (cont'd)	Calibration for the following parameters using insert voltage technique in accordance with IEC 60942: 2003 Annex B	
	Sound pressure level (63 Hz to 4 kHz) at: 94 dB, 104 dB and 114 dB	0.08 dB
	Sound pressure level (above 4 kHz to 8 kHz) at: 94 dB, 104 dB and 114 dB	0.10 dB
	Sound pressure level (above 8 kHz to 16 kHz) at: 94 dB, 104 dB and 114 dB	0.25 dB
	Frequency over the following range: 63 Hz to 16 kHz	0.1 Hz
	Total distortion (63 Hz to 16 kHz; 94 dB; 104 dB; 114 dB) over the following range: 0 % to 5 %	0.5 %

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Acoustic and vibration measurements (cont'd)		
- Acoustic measurements (cont'd)		
- Sound level meter and integrating averaging sound level meter	Calibration for the following parameters in accordance with BS 7580: Part 1: 1997	
	Electrical tests:	
	Self generated noise	0.2 dB
	Linearity	0.2 dB
	Frequency weighting	0.2 dB
	Time weighting F and S	0.2 dB
	Peak response	0.2 dB
	r.m.s. accuracy	0.2 dB
	Time weight I	0.2 dB
	Time averaging	0.2 dB
	Pulse range and sound exposure level	0.3 dB
	Overload indication for SLM	0.2 dB
	Overload indication for integrating SLM	0.3 dB
	Acoustic tests:	
	At 125 Hz by using sound calibrator	0.2 dB
	At 1000 Hz by using sound calibrator	0.2 dB
	At 8000 Hz by using sound calibrator	0.3 dB
	Response to associated sound calibrator	0.2 dB

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Acoustic and vibration measurements (cont'd)		
- Acoustic measurements (cont'd)		
- Sound level meter and integrating averaging sound level meter (cont'd)	Calibration for the following parameters in accordance with IEC 61672-3: 2013	
	Indication at the calibration check frequency	0.2 dB
	Self generated noise-replaced by the electrical input signal device	0.2 dB
	Acoustic signal tests:	
	125 Hz to 1 kHz	0.2 dB
	above 1 kHz to 8 kHz	0.3 dB
	Electrical signal tests of frequency weighting	0.2 dB
	Frequency and time weighting at 1K Hz	0.1 dB
	Long-term stability	0.1 dB
	Level linearity on the reference level range	0.2 dB
	Level linearity including the level range control	0.2 dB
	Toneburst response	0.2 dB
	C-weighted peak sound level	0.2 dB
	Overload indication	0.2 dB
	High-level stability	0.1 dB

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Construction materials testing equipment		
- Cement grout flow cone	Calibration in accordance with in-house procedure SMTP004-CA-051 for the performance as specified in ASTM C939-97 Cl. 8	
	Time of efflux of water from cone: 8.0 s	0.07 s
- Compacting bar	Verification in accordance with in-house procedure SMTP004-CA-046 for the dimensional and mass requirements as specified in CS1: 1990 Vol. 1 (AMD 1102) Cl. A9; or CS1: 2010 Vol. 1 Cl. A10	
	Dimensions of ramming face: 25 mm x 25 mm	0.1 mm
	Length: 380 mm	0.2 mm
	Mass: 1.8 kg	10 g

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Construction materials testing equipment (cont'd)		
- Concrete test cube mould	Verification in accordance with in-house procedure SMTP004-CA-041 for the dimensional requirements as specified in CS1: 1990 Vol. 1 (AMD 1102) Cl. A21; or CS1: 2010 Vol. 1 Cl. A25	
	Dimensions: 100 mm or 150 mm	0.05 mm
	Flatness: not more than 0.03 mm or 0.06 mm	0.005 mm
	Squareness / Perpendicularity: 0.5 mm	0.005 mm
	Parallelism: 1 mm	0.05 mm
- Curing tank	On-site calibration for the following parameters in accordance with in-house procedure SMTP004-CA-034	
	- temperature distribution at a range of (27 ± 3) ℃	0.6 K
	- efficiency of circulation	0.8 minutes
- Drying oven	On-site calibration for the following parameter in accordance with AS 1289.0- 1991 c. 4.2.1 (with modification)	
	Temperature variation: 10 ℃ to 150 ℃	1.0 K
	On-site calibration for the following parameter in accordance with AS 1289.0 - 1991 c. 4.2.3	
	Evaporation rate: 5 g/hr to 40 g/hr	1.0 g/hr

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Construction materials testing equipment (cont'd)		
- Levelling staff	Calibration for length in accordance with in-house procedure SMTP004-CA-205 over the following range :	
	0 m to 5 m	0.8 mm
- Rebound hammer	Calibration for rebound value in accordance with in-house procedure SMTP004-CA-047A using an anvil complying with BS EN 12504-2: 2001 Cl. 4.2	1 rebound count
	Calibration for the friction of rider in accordance with in-house procedure SMTP004-CA-047A	0.03 N
- Sieve (perforated plate)	Verification in accordance with in-house procedure SMTP004-CA-009 for the dimensional requirements as specified in BS 410: 1986	
	Aperture size: 4 mm to 125 mm	0.02 mm
	Bridge width: 0.5 mm to 20 mm	0.02 mm
	Verification in accordance with in-house procedure SMTP004-CA-009D for the dimensional requirements as specified in BS 410-2: 2000; or ISO 3310-2: 1999	
	Hole size: 4 mm to 125 mm	(0.02 + 1.3y) mm where y is the hole size in metre
	Pitch: 4 mm to 200 mm	(0.02 + 1.8y) mm where y is the hole size in metre
	Plate thickness: 0.5 mm to 4 mm	0.1 mm

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Construction materials testing equipment (cont'd)		
- Sieve (woven wire cloth)	Verification in accordance with in-house procedure SMTP004-CA-009B for the dimensional requirements as specified in BS 410: 1986	
	Aperture size: 0.032 mm to 4 mm	(3 + 4.7y) µm where y is the nominal value of aperture size in mm
	Wire diameter: 0.03 mm to 1.5 mm	(3 + 4.7y) µm where y is the nominal value of wire diameter in mm
	Verification in accordance with in-house procedure SMTP004-CA-009C for the dimensional requirements as specified in BS 410-1: 2000; or ISO 3310-1: 2000	
	Aperture size: 0.02 mm to 125 mm	(1.6 + 4.0y) µm where y is the nominal value of aperture size in mm
	Wire diameter: 0.015 mm to 10 mm	(1.6 + 4.0y) µm where y is the nominal value of wire diameter in mm

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Construction materials testing equipment (cont'd)		
- Slump cone	Calibration in accordance with in-house procedure SMTP004-CA-040 for the dimensional requirements as specified in CS1: 1990 Vol. 1 (AMD 1102) Cl. A4; or CS1: 2010 Vol. 1 Cl. A5	
	Wall thickness: minimum 1.5 mm	0.3 mm
	Internal diameter of base: 200 mm	0.7 mm
	Internal diameter of top: 100 mm	0.6 mm
	Height: 300 mm	0.4 mm
- Tamping rod	Calibration in accordance with in-house procedure SMTP004-CA-040 for the dimensional requirements as specified in CS1: 1990 Vol. 1 (AMD 1102) Cl. A5; or CS1: 2010 Vol. 1 Cl. A6	
	Diameter: 16 mm	0.1 mm
	Length: 600 mm	0.5 mm
- Vane shear tester	Calibration for torque in accordance with in-house procedure SMTP004-CA-149 over the following range :	
	0.1 N·m to 50 N·m	1.5 % of reading

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Electricity and magnetism - Time and frequency - Stopwatch	Calibration for time in accordance with in-house procedure SMTP004-CA-019 over the following range : 1 s to 3600 s	 30 ms

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Length and related quantities		
- Angle		
- Angle measuring device	Calibration for angle in accordance with in-house procedure SMTP004-CA-141 over the following range :	
	0^o to 360^o	3.1 minute of arc
- Spirit level (cylindrical vial) 30 mm to 500 mm	Calibration for sensitivity in accordance with BS 3509: 1962: App. A.2C over the following range :	
	0.04 mm/m to 25 mm/m	0.003 mm/m to 1.5 mm/m
- Square length of blade up to 315 mm length of stock up to 200 mm	Calibration for deviation from squareness in accordance with in-house procedure SMTP004-CA-059 over the following range :	
	-20 μm to 20 μm	11 μm

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Length and related quantities (cont'd)		
- Form		
- Straightedge of rectangular section 300 mm to 1000 mm	Calibration for deviation from straightness in accordance with in-house procedure SMTP004-CA-025 over the following range :	
	-30 µm to 30 µm	3.0 µm to 8.2 µm
- Surface plate diagonal length 300 mm to 2000 mm	Calibration for deviation from the flatness overall of the working surface in accordance with in-house procedure SMTP004-CA-090 for the requirements as specified in BS 817: 1988 Cl. 9.2 over the following range :	
	-80 µm to 80 µm	8.6 µm to 18 µm
	Calibration for roughness of the working surface in accordance with in-house procedure SMTP004-CA-090 over the following range :	
	0.1 µm to 5 µm	10 % of reading
	On-site calibration for deviation from the flatness overall of the working surface in accordance with in-house procedure SMTP004-CA-090 for the requirements as specified in BS 817: 1988 Cl. 9.2 over the following range :	
	-80 µm to 80 µm	8.6 µm to 18 µm
	On-site calibration for roughness of the working surface in accordance with in-house procedure SMTP004-CA-090 over the following range :	
	0.1 µm to 5.0 µm	10 % of reading

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Length and related quantities (cont'd) - Form (cont'd) - Surface texture sample	Calibration for roughness (R_a) in accordance with in-house procedure SMTP004-CA-108 over the following range : 0.1μm to 5.0 μm	 10 % of reading

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Length and related quantities (cont'd) - Length		
- Calibration foil	Calibration for thickness in accordance with in-house procedure SMTP-CA-049C over the following range :	
	10 μm to 1500 μm	3.5 μm
- Coating thickness gauge	Calibration for length using calibration foils in accordance with in-house method SMTP-CA-049B over the following range:	
	10 μm to 1500 μm	4.5 μm
- Dial gauge	Calibration for length in accordance with BS 907: 1965 App. B3 over the following ranges :	
	0 mm to 25 mm	6 μm
	0 mm to 50 mm	17 μm
	Calibration for length in accordance with AS 2103: 1978 App. A5 over the following ranges :	
	0 mm to 25 mm	6 μm
	0 mm to 50 mm	17 μm
	Calibration for length in accordance with GEOSPEC 3: 2001 Cl. A.3.4 over the following ranges :	
	0 mm to 25 mm	6 μm
	0 mm to 50 mm	17 μm

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Length and related quantities (cont'd)		
- Length (cont'd)		
- Engineer's steel measuring rule	Calibration for length in accordance with in-house procedure SMTP004-CA-004 over the following range :	
	0 m to 1 m	0.3 mm
- Extensometer		
- Grade C with gauge length from 100 mm to 500 mm - Grade D with gauge length from 50 mm to 500 mm - Grade E or F with gauge length from 25 mm to 500 mm	On-site calibration for displacement using calibration rig and verification of grade in accordance with BS 3846: 1970 (excluding determination of calibration factor) over the following range :	
	0 mm to 25 mm	1.3 µm to 10 µm
- Class 1 or Class 2 with gauge length from 25 mm to 500 mm	On-site calibration for displacement using using calibration rig and verification of class in accordance with BS EN 10002-4: 1995; or BS EN ISO 9513: 2002 over the following range :	
	0 mm to 25 mm	1.3 µm to 10 µm
- External micrometer	Calibration for travel length in accordance with BS 870: 1950 App. A over the following ranges :	
	0 mm to 50 mm	3 µm
	above 50 mm to 100 mm	20 µm

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Length and related quantities (cont'd) - Length (cont'd)		
- Feeler gauge	Calibration for thickness of blade in accordance with in-house procedure SMTP004-CA-032 for the requirements as specified in BS 957: Part 2: 1969 Cl. 6 over the following range :	
	0.03 mm to 1.00 mm	3 μm
- Gauge block	Calibration for length using comparator in accordance with JJG 146-1994 Cl. 23.4 and 24 over the following range :	
	0.5 mm to 100 mm	(0.2 + 3 x length in m) μm
- Linear variable displacement transducer (LVDT)	Calibration for length in accordance with in-house procedure SMTP004-CA-006B over the following range :	
	0 mm to 100 mm	20 μm
	Calibration for length in accordance with GEOSPEC 3: 2001 Cl. A.3.4 over the following ranges :	
	0 mm to 100 mm	20 μm
- Measuring microscope	On-site calibration for length in accordance with in-house procedure SMTP004-CA-151 over the following range :	
	travel distance of x-y measuring stage: 100 mm x 100 mm	3 μm

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Length and related quantities (cont'd) - Length (cont'd)		
- Measuring tape	Calibration for length in accordance with in-house procedure SMTP004-CA-116 over the following range :	
	0 m to 150 m	0.25 mm to 7.5 mm
- Steel measuring tape	Calibration for length in accordance with in-house method SMTP004-CA-116 over the following range :	
	0 m to 150 m	0.32 mm to 9.6 mm
- Thickness gauge	Calibration for length in accordance with in-house method SMTP004-CA-049A over the following range :	
	0 mm to 10 mm	2.8 μm
- Vernier calliper	Calibration for length in accordance with BS 887: 1982 App. B over the following range :	
	External: 0 mm to 300 mm Internal: 0 mm to 300 mm	20 μm 20 μm
- Vernier height gauge	Calibration for length in accordance with BS 1643: 1983 App. A2 over the following range :	
	0 mm to 450 mm	20 μm to 25μm

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED[@] 特定測試或量度的特性[@]	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Mass and related quantities		
- Liquid flow		
- Rotameter	Calibration for water volume flow rate in accordance with in-house method SMTP004-CA-074 over the following ranges :	
	10 l/hr to 70 l/hr	0.4 l/hr to 1.2 l/hr
	above 70 l/hr up to 280 l/hr	1.2 l/hr to 6.5 l/hr
	above 280 l/hr up to 3000 l/hr	6.5 l/hr to 120 l/hr
- Water meter (mechanical type) size of meter : 15 mm to 25 mm	Calibration for the volume of water passed through the water meter in accordance with BS 5728: Part 3: 1997 (ISO 4064-3: 1999) Cl. 5	
	The volume of water collected is nominally 10 litre, 20 litre, 50 litre or 100 litre	1% of reading

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Mass and related quantities (cont'd) - Force - Force testing machine - Compression testing machine	On-site calibration for compressive force using true force method and Grade 1.0 load cells and verification for grade in accordance with BS 1610: Part 1: 1992 over the following range :	
	0.1 kN to 3000 kN	0.4 % of reading
	On-site calibration for compressive force using true force method or indicated force method and Class 1 load cells and verification for class in accordance with BS EN ISO 7500-1: 2004; or BS EN 12390-4: 2000 Annex B over the following range :	
	0.1 kN to 3000 kN	0.4 % of reading
	On-site calibration for compressive force using true force method and Class 1 load cells and verification for class in accordance with CS1 : 2010 Vol.2 App. D over the following range :	
	0.1 kN to 3000 kN	0.4 % of reading

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Mass and related quantities (cont'd) - Force (cont'd) - Force testing machine (cont'd) - Compression testing machine (cont'd)	On-site verification for strain ratio by performing strain gauged column and proving test (stability test) in accordance with BS 1881: Part 115: 1986 + Amd. 6536; or BS EN 12390-4: 2000 Annex A; or CS1: 1990 Vol.2 App. D; or CS1: 2010 Vol.2 App. D over the following range : 200 kN to 2000 kN	 0.02 strain ratio

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Mass and related quantities (cont'd) - Force (cont'd) - Force testing machine (cont'd) - Uniaxial testing machine in tension mode	On-site calibration for tensile force using true force method and Grade 1.0 load cells and verification for grade in accordance with BS 1610: Part 1: 1985 over the following range:	
	0.2 kN to 2000 kN	0.4 % of reading
	On-site calibration of tensile force using true force method or indicated force method and Class 1 load cells and verification for class in accordance with BS EN ISO 7500-1: 2004 over the following range :	
	0.2 kN to 2000 kN	0.4 % of reading
- Universal testing machine in compression mode	On-site calibration for compressive force using true force method and Grade 1.0 load cells and verification for grade in accordance with BS 1610: Part 1: 1985; or BS 1610: Part 1: 1992 over the following range:	
	0.1 kN to 3000 kN	0.4 % of reading
	On-site calibration for compressive force using true force method or indicated force method and Class 1 load cells and verification for class in accordance with BS EN ISO 7500-1:2004 over the following range :	
	0.1 kN to 3000 kN	0.4 % of reading

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Mass and related quantities (cont'd) - Force (cont'd)		
- Impact testing machine	On-site indirect verification in accordance with BS EN 10045-2: 1993 Cl. 6 over the following two absorbed energy levels :	
	20 J to 40 J	2.7 J
	above 40 J to 150 J	10 J
- Load cell or other force transducer in compression and tension mode	Calibration for compressive and tensile forces in accordance with in-house procedure SMTP004-CA-028 over the following ranges :	
	0.1 kN to 10 kN	0.16 % of reading
	above 10 kN to 50 kN	0.23 % of reading
	On-site calibration of compressive and tensile forces in accordance with in-house procedure SMTP004-CA-028 over the following ranges :	
	0.1 kN to 10 kN	0.16 % of reading
	above 10 kN to 50 kN	0.23 % of reading

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Mass and related quantities (cont'd)		
- Force (cont'd)		
- Load cell or other force transducer in compression mode	Calibration for compressive force in accordance with GEOSPEC 3: 2001 Cl. A.3.1 over the following ranges :	
	0.1 kN to 10 kN	0.16 % of reading
	above 10 kN to 50 kN	0.23 % of reading
	On-site calibration for compressive force in accordance with GEOSPEC 3: 2001 Cl. A.3.1 over the following ranges :	
	0.1 kN to 10 kN	0.16 % of reading
	above 10 kN to 50 kN	0.23 % of reading
	Calibration for compressive force in accordance with in-house procedure SMTP004-CA-028A over the following ranges :	
	50 kN to 500 kN	0.6 % of reading
	above 500 kN to 3000 kN	0.6 % of reading
- Proving ring in compression mode	Calibration for compressive force in accordance with in-house procedure SMTP004-CA-028 over the following ranges :	
	0.1 kN to 10 kN	0.35 % of reading
	above 10 kN to 50 kN	0.22 % of reading
	Calibration for compressive force in accordance with GEOSPEC 3: 2001 Cl. A.3.1 over the following ranges :	
	0.1 kN to 10 kN	0.35 % of reading
	above 10 kN to 50 kN	0.22 % of reading

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Mass and related quantities (cont'd) - Force (cont'd) - Push-pull gauge	Calibration for compressive and tensile forces in accordance with in-house procedure SMTP004-CA-165 using standard weights over the following range : 2 N to 100 N	 0.03 N to 0.4 N

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Mass and related quantities (cont'd)		
- Hardness		
- Hardness sample	Calibration for hardness in accordance with ASTM E18-98 cl. 7 over the following ranges :	
	Rockwell scale	
	47.2 HRB to 90.1 HRB	2.6 HRB
	27.7 HRC to 63.8 HRC	1.7 HRC
	Calibration for hardness in accordance with BS EN ISO 6508-1: 2005 cl. 7 over the following ranges :	
	Rockwell scale	
	20 HRB to 100 HRB	2.8 HRB
	20 HRC to 70 HRC	1.5 HRC
	Calibration for hardness in accordance with BS 427: 1990 Section 2 cl. 8 over the following range :	
	Vickers scale	
	210 HV30 to 730 HV30	3.3% HV30
	Calibration for hardness in accordance with BS EN ISO 6507-1: 2005 cl. 7 over the following range :	
	Vickers scale	
	210 HV30 to 730 HV30	2.6% HV30

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Mass and related quantities (cont'd) - Hardness (cont'd) - Hardness testing machine	On-site indirect verification of testing machine for Rockwell hardness scales in accordance with ASTM E18-98 Cl. 13.2 over the following ranges :	
	47.2 HRC to 90.1 HRC	1.2 HRC
	27.7 HRB to 63.8 HRB	1.8 HRB
	On-site indirect verification of testing machine for Rockwell hardness scales in accordance with BS EN ISO 6508-2: 2005 Cl. 5 over the following ranges :	
	20 HRB to 100 HRB	1.2 HRB
	20 HRC to 70 HRC	0.6 HRC
	On-site indirect verification of testing machine for Vickers hardness scale in accordance with BS 427: 1990 Section 4 Cl. 16 over the following range :	
	210 HV30 to 730 HV30	2.6 % HV 30
	On-site indirect verification of testing machine for Vickers hardness scale in accordance with BS EN ISO 6507-2: 2005 Cl. 5 over the following range :	
	210 HV30 to 730 HV30	2.2 % HV30

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Mass and related quantities (cont'd) - Pressure - Pressure gauge	Calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using oil as pressure medium over the following ranges :	
	40 kPa to 6000 kPa	0.68 kPa to 11 kPa
	above 6000 kPa to 60000 kPa	170 kPa
	Calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	On-site calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	Calibration for pressure in accordance with GEOSPEC 3: 2001 Cl. A.3.2 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	On-site calibration for pressure in accordance with GEOSPEC 3: 2001 Cl. A.3.2 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	Calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using gas as pressure medium over the following range :	
	4 kPa to 400 kPa	0.3 kPa to 0.7 kPa

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Mass and related quantities (cont'd) - Pressure (cont'd) - Pressure transducer	Calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using oil as pressure medium over the following ranges :	
	40 kPa to 600 kPa	0.12 kPa to 0.24 kPa
	100 kPa to 6000 kPa	0.19 kPa to 1.8 kPa
	Calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	On-site calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	Calibration for pressure in accordance with GEOSPEC 3: 2001 Cl. A.3.2 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	On-site calibration for pressure in accordance with GEOSPEC 3: 2001 Cl. A.3.2 using water as pressure medium over the following range :	
	10 kPa to 800 kPa	0.3 kPa to 1.2 kPa
	Calibration for pressure in accordance with in-house procedure SMTP004-CA-027 using gas as pressure medium over the following range :	
	4 kPa to 400 kPa	0.2 kPa to 0.3 kPa

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Mass and related quantities (cont'd) - Pressure (cont'd) - Vacuum gauge	Calibration for pressure using dead-weight tester in accordance with in-house procedure SMTP004-CA-146 over the following range : - 100 kPa to - 5 kPa	 0.33 kPa

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Mass and related quantities (cont'd) - Torque - Torque wrench	Calibration for torque in accordance with in-house procedure SMTP004-CA-120 over the following ranges :	
	0.1 N·m to 1.0 N·m	0.007 N·m to 0.021 N·m
	above 1 N·m to 5 N·m	0.025 N·m to 0.06 N·m
	above 5 N·m to 50 N·m	0.12 N·m to 0.65 N·m
	above 50 N·m to 1000 N·m	1.1 N·m to 11 N·m

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Mass and related quantities (cont'd)		
- Volume		
- Single channel piston-operated pipette (for type A only)	Calibration for the delivered volume in accordance with ISO 8655-6: 2002 over the following ranges :	
	10 µl to 50 µl	0.7 µl
	above 50 µl to 100 µl	1.2 µl
	above 100 µl to 500 µl	7 µl
	above 500 µl to 1 ml	8 µl
	above 1 ml to 5 ml	35 µl
	above 5 ml to 10 ml	60 µl
	Calibration for the delivered volume in accordance with in-house procedure SMTP004-CA-240 over the following ranges :	
	10 µl to 50 µl	0.7 µl
	above 50 µl to 100 µl	1.2 µl
	above 100 µl to 500 µl	7 µl
	above 500 µl to 1 ml	8 µl
	above 1 ml to 5 ml	35 µl
	above 5 ml to 10 ml	60 µl
- Volumetric tank	Calibration for volume in accordance with in-house procedure SMTP004-CA-154-1 over the following range :	
	20 l to 100 l	61 ml to 170 ml

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Mass and related quantities (cont'd)		
- Mass		
- Electronic balance	Calibration for mass in accordance with in-house procedure SMTP004-CA-003 using following OIML Class standard weights (1) E1 weights from 1 mg to 500 g (2) F1 weights from 1 mg to 20 kg (3) M1 weights from 10 kg to 20 kg over the following ranges :	
	1 mg to 5 g	0.02 mg
	above 5 g to 100 g	0.02 mg to 0.2 mg
	above 100 g to 1 kg	0.2 mg to 6 mg
	above 1 kg to 10 kg	6 mg to 40 mg
	above 10 kg to 50 kg	40 mg to 2 g
	above 50 kg to 110 kg	2 g to 10 g
	On-site calibration for mass in accordance with in-house procedure SMTP004-CA-003 using following OIML Class standard weights (1) E1 weights from 1 mg to 500 g (2) F1 weights from 1 mg to 20 kg (3) M1 weights from 10 kg to 20 kg over the following ranges :	
	1 mg to 5 g	0.02 mg
	above 5 g to 100 g	0.02 mg to 0.2 mg
	above 100 g to 1 kg	0.2 mg to 6 mg
	above 1 kg to 10 kg	6 mg to 40 mg
	above 10 kg to 50 kg	40 mg to 2 g
	above 50 kg to 110 kg	2 g to 10 g

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Mass and related quantities (cont'd) - Mass (cont'd) - Weight	Calibration for mass in accordance with in-house procedure SMTP004-CA-007 over the following ranges :	
	10 mg to 1 g	0.09 mg
	above 1 g to 80 g	0.2 mg
	above 80 g to 200 g	0.4 mg
	above 200 g to 1 kg	5 mg
	above 1 kg to 10 kg	20 mg
	above 10 kg to 30 kg	310 mg

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Thermometry		
- Humidity		
- Hygrometer	Calibration for relative humidity within the room temperature range of 20 ℃ to 25 ℃ in accordance with in-house procedure SMTP004-CA-145 over the following range :	
	10 %rh to 90 %rh	2.3 % RH to 3.4 % RH
- Temperature		
- Dial thermometer	Calibration for temperature in accordance with in-house procedure SMTP004-CA-127 over the following ranges :	
	0 ℃ to 110 ℃	1.7 K
	above 110 ℃ to 500 ℃	4.0 K
- Electronic thermometer	Calibration for temperature in accordance with in-house procedure SMTP004-CA-026 over the following ranges :	
	-10 ℃ to 110 ℃	0.3 K
	above 110 ℃ to 200 ℃	0.5 K
	above 200 ℃ to 600 ℃	3.4 K
	above 600 ℃ to 960 ℃	6.3 K
- Liquid-in-glass thermometer	Calibration for temperature in accordance with in-house procedure SMTP004- CA-013 over the following ranges :	
	-10 ℃ to -5 ℃	0.3 K
	above -5 ℃ to 110 ℃	0.1 K

[@] Unless otherwise specified, accredited activities are conducted at the laboratory.

* The calibration uncertainty of a device under test, which is usually reported at 95% confidence level, depends on both the CMC of the laboratory and the performance of the device during calibration.

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Adhesive	Pull-off test of tile adhesive	In-house method FT017
	Pull-off test of tiles	In-house method FT005
	Pull-off test on concrete	Hong Kong Housing Authority Materials Testing Services (2022/2024) for Maintenance and Building Materials Specification Part D Cl. 4.1.3
	Pull-off test of repair mortar	Hong Kong Housing Authority Materials Testing Services (2022/2024) for Maintenance and Building Materials Specification Part D Cl. 2.1.15 Method 1
Admixtures (Chemical analysis)	Ash content	BS 5075: Part 1: 1982 (Amd. 11057) App. D.2
	Chloride content	BS 5075: Part 1: 1982 (Amd. 11057) App. E
	Water-soluble chloride content	BS EN 480: Part 10: 2009
	Dry material content	BS 5075: Part 1: 1982 (Amd. 11057) App. D.1
	Conventional dry material content	BS EN 480: Part 8: 2012
	Relative density (liquid)	BS 5075: Part 1: 1982 (Amd. 11057) App. D.3
	Density of liquid admixture	ISO 758: 1976
	pH value	In-house method SMTP003-CH(AD)-001
	pH of liquid admixture	ISO 4316: 1977
	Acid-soluble alkali content (equivalent Na_2O)	In-house method SMTP003-CH(AD)-006
	Alkali content (as equivalent Na_2O)	BS EN 480: Part 12: 2005
	Sodium oxide content	BS EN 480: Part 12: 2005
	Potassium oxide content	BS EN 480: Part 12: 2005

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Aggregates	Sampling	BS 812: Part 102: 1989 CS3: 2013 Section 8
	Particle size distribution	BS 812: Section 103.1: 1985 + Amd. 6003 (by sieve analysis) CS3: 2013 Section 10 (by sieve analysis)
	Flakiness index	BS 812: Section 105.1: 1989 CS3: 2013 Section 11
	Elongation index	BS 812: Section 105.2: 1990 CS3: 2013 Section 12
	Methylene blue value	CS3: 2013 Section 13
	Los Angeles value	CS3: 2013 Section 14
	Aggregate impact value	BS 812: Part 3: 1975 + Amd. 4616 BS 812: Part 112: 1990 + Amd. 8772 CS3: 2013 Section 15
	Ten per cent fines value	BS 812: Part 111: 1990 CS3: 2013 Section 16
	Particle densities and water absorption	BS 812: Part 2: 1995 + Amd. 9195 & Amd. 10379 Cl. 5 CS3: 2013 Section 17
	Moisture content	BS 812: Section 109: 1990 (by oven drying method) CS3: 2013 Section 18 (by oven drying method)
	Soundness	BS 812: Part 121: 1989 excluding Cl.4 & App. A CS3: 2013 Section 19
	Drying shrinkage	CS3: 2013 Section 20
	Effect of organic substances by mortar method	CS3: 2013 Section 22
	Alkali silica reaction potential by ultra-accelerated mortar-bar test	CS1: 2010 Section 22

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Aggregates (cont'd)	Clay, silt and dust content	BS 812: Part 1: 1975 + Amd. 4875 Cl. 7.2 (Decantation method)
	Bulk density	BS 812: Part 2: 1975 + Amd. 4615 Cl. 6
	Relative density and water absorption	BS 812: Part 2: 1975 + Amd. 4615 (Gas jar method & wire basket method)
	Shell content in coarse aggregates	BS 812: Part 106: 1985
	Aggregate crushing value	BS 812: Part 110: 1990
	Resistance to degradation of small size coarse aggregate by abrasion and impact in the Los Angeles Machine	ASTM C131-81 with modification ASTM C131-96 with modification
	Resistance to degradation of large size coarse aggregate by abrasion and impact in the Los Angeles Machine	ASTM C535-81 with modification ASTM C535-96 with modification
	Compacting fraction value of aggregates for granular bed	General Specification for Civil Engineering Works, (2006) Vol. 1 App. 5.2 Hong Kong Housing Authority Specification Library (2018) DRA2.T250.7 to DRA2.T280.8 Hong Kong Housing Authority Specification Library (2022) DRA2.T250.9 to DRA2.T280.9

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Aggregate (Chemical analysis)	Acid-soluble material	BS 812: Part 119: 1985 *Excluding* Cl. 4
	Water-soluble chloride salts	BS 812: Part 117: 1988 *Excluding* Cl. 4
	Water-soluble chloride ion content	CS3: 2013 Section 21.3
	Acid-soluble chloride ion content	CS3: 2013 Section 21.4
	Chloride content (acid extraction)	BS 812: Part 117: 1988 App. C *Excluding* Cl. 4
	Water-soluble sulphate content	BS 812: Part 118: 1988 Cl. 5 *Excluding* Cl. 4 (gravimetric)
	Total sulphate content (acid extraction)	BS 812: Part 118: 1988 Cl. 6 *Excluding* Cl. 4
	Acid-soluble sulphate content	CS3: 2013 Section 21.5
	Total sulphur content	CS3: 2013 Section 21.6
	Soluble calcium oxide content	HKHA MTS (2012/2014) for Construction Materials Specification Part D Cl. 1.4.9
	Soluble silica content	HKHA MTS (2012/2014) for Construction Materials Specification Part D Cl. 1.4.9
	Presence of humus	CS3: 2013 Section 21.7

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Bituminous materials	Bulk specific gravity and density of non-absorptive compacted bituminous mixtures	ASTM D2726-96a Method 9.1
	Bulk specific gravity and density of compacted bituminous mixtures using automatic vacuum sealing method	ASTM D6752-11 ASTM D6752M-11
	Percentage air voids in compacted dense bituminous paving mixtures	ASTM D3203-94 ASTM D3203/D3203M-11
	Polymer modified binder content and particle size distribution of polymer modified friction coarse and cushion coarse materials by centrifuge method and ignition method	Particular Specification for Highways Department Guidance Notes on Road Surface Requirements for Expressways and High Speed Roads RD/GD/032 (Jun 2007) App. B
	Quantitative extraction of bitumen from bituminous paving mixtures	ASTM D2172-95 (Method A using ashing method)
	Sieve analysis of fine and coarse aggregates and materials finer than 75 micron sieve in mineral aggregates by washing	ASTM C117-95 Procedure B ASTM C136-96a with modification
	Theoretical maximum specific gravity of bituminous paving mixtures	ASTM D2041-95 (Weighing in water method using type A container) with modification
Blocks & Bricks	Compressive strength of clay bricks	BS 3921: 1985 + Amd. 8946 App. D
	Compressive strength of interlocking blocks	Hong Kong Housing Authority Specification Library (2018) EXT3.T110.8 - T160.8 Hong Kong Housing Authority Specification Library (2022) EXT3.T110.9 - T160.9
	Compressive strength of paving blocks	General Specification for Civil Engineering Works (2006) Vol. 1 App. 11.1 General Specification for Civil Engineering Works (2020) Vol. 1 App. 11.1
	Compressive strength of precast concrete masonry units	BS 6073: Part1: 1981 + Amd. 3944 & 4462 App. B

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Blocks & Bricks (cont'd)	Compressive strength of precast concrete paving blocks	BS 6717: Part 1: 1993 Annex B
	Dimensions of clay and calcium silicate pavers	BS 6677: Part 1: 1986 App. A & C
	Dimensions of clay bricks	BS 3921: 1985 + Amd. 8946 App. A
	Dimensions of paving blocks	BS 6717: Part 1: 2001 Annex B BS EN 1338: 2003 + Corr 1: 2006 Annex C in conjunction with the following specification(s): BS EN 1338: 2003 + Corr 1: 2006 Table 1 & 2 General Specification for Civil Engineering Works (2020) Vol. 1 Cl. 11.86 (4)
	Dimensions and plan area of precast concrete paving blocks	BS 6717: Part 1: 1993 Annex A
	Dimensions of precast concrete flags, kerbs, channels and edgings	BS 7263: Part 1: 1994 Annex A
	Dimensions of precast concrete masonry units	BS 6073: Part1: 1981 + Amd. 3944 & 4462 App. A
	Transverse breaking load of clay & calcium silicate pavers	BS 6677: Part 1: 1986 App. D
	Transverse strength of precast concrete flags, kerbs, channels and edgings	BS 7263: Part1: 1994 Annex B
	Transverse strength of precast concrete masonry units	BS 6073: Part1: 1981 + Amd. 3944 & 4462 App. C
	Skid resistance value of clay & calcium silicate pavers	BS 6677: Part 1: 1986 App. E
	Unpolished slip/skid resistance value of clay pavers	BS EN 1344: 2002 Annex F
	Water absorption of clay bricks	BS 3921: 1985 + Amd. 8946 App. E
	Water absorption of masonry units, segmental pavers and flags	AS/NZS 4456.14: 1997 AS/NZS 4456.14: 2003
	Water absorption of precast concrete flags, kerbs, channels and edgings	BS 7263: Part 1: 1994 Annex C

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Cement & Portland pulverized fuel ash cement (PPFAC)	Compressive strength of broken mortar prisms in the force range 5 kN - 250 kN	BS EN 196-1: 1995 BS EN 196-1: 2005 BS EN 196-1: 2016
	Density	BS EN 196-6: 1992 Annex NC BS EN 196-6: 2010 Annex NC BS EN 196-6: 2018 Annex NC
	Fineness	BS EN 196-6: 1992 (by Blaine Method) BS EN 196-6: 2010 (by Blaine Method) BS EN 196-6: 2018 (by Blaine Method)
	Flexural strength of mortar prisms in the force range 0.5 kN - 5 kN	BS EN 196-1: 1995 BS EN 196-1: 2005 BS EN 196-1: 2016
	Sampling	BS EN 196-7: 2007
	Setting times	BS EN 196-3: 1995 BS EN 196-3: 2005 + A1: 2008 BS EN 196-3: 2016
	Soundness	BS EN 196-3: 1995 BS EN 196-3: 2005 + A1: 2008 BS EN 196-3: 2016
	Standard consistence	BS EN 196-3: 1995 BS EN 196-3: 2005 + A1: 2008 BS EN 196-3: 2016
Cement stabilised soil	Unconfined compressive strength of cement stabilised soil cores (with or without capping)	Interim Guidelines on Testing of Unconfined Compressive Strength of Cement Stabilised Soil Cores in Hong Kong (Oct 2017) App. B published by Geotechnical Division of The Hong Kong Institution of Engineers

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Cement (Chemical analysis)	Aluminium oxide content (Al_2O_3)	BS EN 196: Part 2 : 1995 Cl. 13.11
	Chloride ion content	BS EN 196: Part 21: 1992 Cl. 4
	Residue insoluble in hydrochloric acid and sodium carbonate	BS EN 196: Part 2: 1995 Cl. 9
	Iron (III) oxide content (Fe_2O_3)	BS EN 196: Part 2: 1995 Cl. 13.10
	Loss-on-ignition (L.O.I.)	BS EN 196: Part 2: 1995 Cl. 7
	Magnesium oxide content (MgO)	BS EN 196: Part 2: 1995 Cl. 13.15
	Manganese content (Mn)	BS EN 196: Part 2: 1995 Cl. 12
	Manganese content (as MnO)	BS EN 196: Part 2: 1995 Cl. 12
	Manganese content (as Mn_2O_3)	BS EN 196: Part 2: 1995 Cl. 12
	Impure silica content	BS EN 196: Part 2: 1995 Cl. 13.2 & Cl. 13.3
	Pure silica content	BS EN 196: Part 2: 1995 Cl. 13.6
	Soluble silica content	BS EN 196: Part 2: 1995 Cl. 13.7 and Cl. 13.8
	Total silica content (SiO_2)	BS EN 196: Part 2: 1995 Cl. 13.9
	Sulfate content (as SO_3)	BS EN 196: Part 2: 1995 Cl. 8
	Calcium oxide content (CaO)	BS EN 196: Part 2: 1995 Cl. 13.14
	Heat of hydration	BS 4550: Part 3: Section 3.8: 1978 with modification
	Alkali content	BS EN 196: Part 21: 1992 Cl. 7 (reference method)

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Portland cement with insoluble residue content < 1% (Chemical analysis)	Insoluble residue	ASTM C114-18 Cl. 7
	Silicon dioxide (SiO_2) content	ASTM C114-18 Cl. 8
	Ferric oxide content (Fe_2O_3)	ASTM C114-18 Cl. 10
	Phosphorus pcntoxidc content (P_2O_5)	ASTM C114-18 Cl. 11
	Titanium dioxide content (TiO_2)	ASTM C114-18 Cl. 12
	Aluminium oxide content (Al_2O_3)	ASTM C114-18 Cl. 9, Cl. 10, Cl. 11, Cl. 12 & Cl. 14
	Sulfur trioxide content (as SO_3)	ASTM C114-18 Cl. 17.1
	Magnesium oxide content (MgO)	ASTM C114-18 Cl. 23.2.1, Cl. 23.2.2 , Cl. 16.3 & Cl. 16.4
	Calcium oxide content (CaO)	ASTM C114-18 Cl. 23

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Concrete	Sampling fresh concrete on site	CS1: 2010 Section 1
	Slump of fresh concrete	CS1: 2010 + Amd. 1/2017 Section 2 Part I
	Compacting factor of fresh concrete	CS1: 2010 Section 2 Part II
	Vebe time of fresh concrete	CS1: 2010 Section 2 Part III
	Flow table test	CS1: 2010 Section 2 Part IV
	Slump flow test	CS1: 2010 Section 2 Part V
	Stiffening time	CS1: 2010 Section 3
	Density of compacted fresh concrete	CS1: 2010 Section 5
	Air content of fresh concrete	CS1: 2010 Section 6
	Making test cubes from fresh concrete	CS1: 2010 Section 7
	Making test beams from fresh concrete	CS1: 2010 Section 8
	Making test cylinders from fresh concrete	CS1: 2010 Section 9
	Curing of test specimens	CS 1: 2010 Section 10
	Mixing and sampling of fresh concrete in the laboratory	CS1: 2010 Section 11
	Compressive strength of concrete cubes in the force range 50 kN - 3000 kN	CS1: 2010 Section 12
	Tensile splitting strength of cylinders	CS1: 2010 Section 13
	Flexural strength of beams	CS1: 2010 Section 14
	Obtaining core samples	CS1: 2010 Section 15
	Compressive strength of concrete cores in the force range 50 kN - 3000 kN	CS1: 2010 Section 15
	Density of hardened concrete	CS1: 2010 Section 16

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Concrete (cont'd)	Depth of penetration of water under pressure	CS1: 2010 Section 18
	Concrete's ability to resist chloride ion penetration	CS1: 2010 Section 19
	Alkali silica reaction potential by concrete prism test	CS1: 2010 Section 23
	Accelerated curing of test specimens	BS 1881: Part 112: 1983 + Amd. 6100 (Method 35℃, 55℃ and 82℃)
	Water absorption	BS 1881: Part 122: 1983 + Amd. 6108
	Assessment of the cement, aggregate and water contents of fresh concrete	BS 1881: Part 128: 1997 Annex A (Buoyancy method)
	Monitoring of setting time of fresh concrete	Hong Kong Housing Authority Materials Testing Services (2017/2018) for Construction Materials Specification Part D Cl. 1.3.9
	Temperature monitoring (Heat of hydration monitoring)	In-house method FT045
	Temperature measurement of fresh concrete	BS 5328: Part 4: 1990 Cl. 3.4(b)
Concrete (diagnostic)	Covermeter survey	BS 1881: Part 204: 1988
	Surface hardness measurement	BS 1881: Part 202: 1986 BS EN 12504-2: 2001 BS EN 12504-2: 2012
	Ultrasonic pulse velocity measurement	BS 1881: Part 203: 1986 Cl. 6 (direct transmission)

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Concrete (Chemical analysis)	Treatment of samples	BS 1881: Part 124: 1988 Cl. 4 CS1: 1990 Section 21.4 CS1: 2010 Section 21.4
	Cement and aggregate content (by CaO determination)	BS 1881: Part 124: 1988 Cl. 5.4 & 5.9 CS1: 1990 Section 21.6.4, 21.6.6 & 21.6.7 CS1: 2010 Section 21.6.4, 21.6.6 & 21.6.7
	Cement and aggregate content (by SiO_2 determination)	BS 1881: Part 124: 1988 Cl. 5.5 & 5.9 CS1: 1990 Section 21.6.5, 21.6.6 & 21.6.7 CS1: 2010 Section 21.6.5, 21.6.6 & 21.6.7
	Aggregate / cement ratio	BS 1881 Part 124: 1988 Cl. 5.9
	Chloride content	BS 1881: Part 124: 1988 Cl. 10.2 CS1: 1990 Section 21.10. 2 CS1: 2010 Section 21.10. 2
	Sulphate content	BS 1881: Part 124: 1988 Cl. 10.3 CS1: 1990 Section 21.10.3 CS1: 2010 Section 21.10.3
	Combined water content	BS 1881: Part 124: 1988 Cl. 7.5 CS1: 1990 Section 21.7.5 CS1: 2010 Section 21.7.5
	Capillary porosity	BS 1881: Part 124: 1988 Cl. 7.4 CS1: 1990 Section 21.7.4 CS1: 2010 Section 21.7.4
	Original water content	BS 1881: Part 124: 1988 Cl. 7 CS1: 1990 Section 21.7 CS1: 2010 Section 21.7
	Original water/cement ratio	BS 1881: Part 124: 1988 Cl. 5 & 7 CS1: 1990 Sections 21.6 and 21.7 CS1: 2010 Sections 21.6 and 21.7

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Concrete (Chemical analysis) (cont'd)	Carbonate content	CS1: 1990 Section 21.10.4.2 (manometric) CS1: 2010 Section 21.10.4.2 (manometric)
	Detection of PFA	CS1: 1990 Section 21.5 CS1: 2010 Section 21.5
	pH value	In-house method SMTP003-CH(CO)-009
Foundation	Crosshole sonic logging test (SOLT)	ASTM D6760-02 ASTM D6760-16
	Pile dynamic test (PDA)	ASTM D4945-17
	Plate load test (PLT)	BS 1377: Part 9: 1990 Cl. 4.1 (incremental loading) excluding Cl. 4.1.6.1 Buildings Department Code of Practice for Foundations (Apr 2017) Cl. 8.2(2) excluding 8.2(2)(f) to (h)
Ground granulated blastfurnace slag (GGBS)	Fineness	BS EN 196-6: 2010 Cl. 4 (by Blaine method)
	Initial setting time	BS EN 196-3: 1995 Cl. 5 & 6
	Flexural strength of mortar prism in the force range 0.5 kN – 10 kN	BS EN 196-1: 1995
	Compressive strength of broken mortar prism in the force range 5 kN – 250 kN	BS EN 196-1: 1995
	Activity index	BS EN 15167-1: 2006 Cl. 5.3.2.3

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Ground granulated blastfurnace slag (GGBS) (Chemical analysis)	Sample preparation	BS EN 196: Part 2: 2005 Cl. 6
	Moisture content	BS EN 15167: Part 1: 2006 Annex A
	Loss-on-ignition (L.O.I.), corrected for oxidation of sulfides	BS EN 196: Part 2: 2005 Cl. 7
	Sulfide content (as S^{2-})	BS EN 196: Part 2: 2005 Cl. 11
	Sulfate content (as SO_3)	BS EN 196: Part 2: 2005 Cl. 8
	Aluminium oxide content (Al_2O_3)	BS EN 196: Part 2: 2005 Cl. 13.11
	Magnesium oxide content (MgO)	BS EN 196: Part 2: 2005 Cl. 13.13 (reference method)
	Calcium oxide content (CaO)	BS EN 196: Part 2: 2005 Cl. 13.12 (reference method)
	Chloride content (Cl^-)	BS EN 196: Part 2: 2005 Cl. 14
	Iron (III) oxide content (Fe_2O_3)	BS EN 196: Part 2: 2005 Cl. 13.10
	Total alkali content (equivalent Na_2O)	BS EN 196: Part 21: 1992 Cl. 7 (reference method)
	Total silica content (SiO_2)	BS EN 196: Part 2: 2005 Cl. 13.9
	Pure silica content	BS EN 196: Part 2: 2005 Cl. 13.6
	Soluble silica content	BS EN 196: Part 2: 2005 Cl. 13.7 and Cl. 13.8
	Impure silica content	BS EN 196: Part 2: 2005 Cl. 13.2 and Cl. 13.4

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Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永基路 22-24 號好爸爸創科大廈

Construction Materials 建築材料		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Grout	Bleeding and free expansion	General Specification for Civil Engineering Works (2006) Vol.2 Cl. 17.60 Hong Kong Housing Authority Specification Library (2022) Cl. PIL 1.T320.9
	Change in height	ASTM C1090-01 (Re-approved 2005) ASTM C1090-15
	Compressive strength of grout cubes in the force range of 50 kN – 3000 kN	In-house method SMTP 001-CO-031 Hong Kong Housing Authority Materials Testing Services (2017/2018) for Construction Materials Specification Part D Cl. 2.1
	Early change in height	ASTM C827-01a (Re-approved 2005) ASTM C827-16
	Flow of grout for preplaced-aggregate concrete (flow cone method)	ASTM C939-97 ASTM C939-97 with modification (using 19 mm diameter discharge tube flow cone) ASTM C939-16a ASTM C939-16a with modifications (using 19 mm diameter discharge tube flow cone)
	Modified Figg test-Air permeability test	Hong Kong Housing Authority Materials Testing Services (2017/2018) for Construction Materials Specification Part D Cl. 2.8 Hong Kong Housing Authority Specification Library (2022) CON 2.T120.9(2)
	Setting time	ASTM C953-06 ASTM C953-17

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Ground water (Chemical analysis)	Sulphate content	BS 1377: Part 3: 1990 Cl. 5 *Excluding* Cl. 5.6 GEO Report No. 36 Test 3.5.5: 1996 GEOSPEC 3: 2001 Cl. 9.3 GEOSPEC 3: 2017 Cl. 9.3
	pH value	BS 1377: Part 3: 1990 Cl. 9 GEOSPEC 3: 2001 Cl. 9.5 GEOSPEC 3: 2017 Cl. 9.5
Manhole steps	Bending test of manhole steps	BS 1247: Part 1: 1990 App. A
	Pull-out test of manhole steps	BS 1247: Part 1: 1990 App. B
	Twist test of manhole steps	BS 1247: Part 1: 1990 Cl. 7.1
	Twist test of steps for underground man entry chambers	BS EN 13101: 2002 Annex A
	Vertical loading test of steps for underground man entry chambers	BS EN 13101: 2002 Annex B
	Pull-out test of steps for underground man entry chambers	BS EN 13101: 2002 Annex D

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Metallic materials	Mass per meter of steel reinforcing bars	BS 4449: 2005 + A2: 2009 Cl. 7.3 CS2: 2012 (Rev. 6) Cl. 6.1 & 6.2
	Bend test of carbon steel bars	BS 4449: 1988 Cl. 10.2 CS2: 1995 Cl. 6.1 & 6.3
	Rebend test of carbon steel bars	BS 4449: 1988 Cl. 10.3 CS2: 1995 Cl. 6.1 & 6.4
	Rebend test of reinforcing bars, wire rods, welded fabrics or cold reduced wires for reinforcement of concrete	BS EN ISO 15630-1: 2002 Cl. 7 in conjunction with the following specification(s): BS 4449: 2005 + A2: 2009 Cl. 7.2.5 BS 4482: 1985 Cl. 12.2 & App. C.5 BS 4482: 2005 Cl. 7.2.4 & 9 BS 4483: 1985 Cl. 12.1 BS 4483: 1998 Cl. 13.1 BS 4483: 2005 Cl. 7.2.5 & 8.1.3.2 CS2: 2012 (Rev. 6) Cl. 6.1 & 6.5
	Bond property of steel reinforcing bars by surface geometry measurement	BS EN ISO 15630-1: 2002 Cl. 10, 11.2 & 11.3 in conjunction with the following specification(s): BS 4449: 2005 + A2: 2009 Cl. 7.4 & 9 CS2: 2012 (Rev. 6) Cl. 6.1 & 6.7.2
	Charpy V-notch impact test	BS EN 10045-1: 1990 BS EN ISO 148-1: 2016
	Tensile test of carbon steel bars in the force range 2 kN – 2000 kN	BS 4449: 1988 CS2: 1995 Cl. 6.1 & 6.2
	Tensile test of reinforcing bars, wire rods, welded fabrics or cold reduced wires for reinforcement of concrete in the force range 2 kN - 2000 kN	BS EN 10002-1: 2001 BS EN ISO 6892-1: 2009 Cl. 10.4 Method B in conjunction with the following specification(s): BS 4449: 2005 + A2: 2009 Cl. 7.2.2, 7.2.3 & 8.1.3.1 BS 4482: 1985 Cl. 12.1 & App. C.3 BS 4482: 2005 Cl. 8.1.3.1 & 9 BS 4483: 1985 Cl. 12.1 BS 4483: 1998 Cl. 13.1 BS 4483: 2005 Cl. 7.2.2, 7.2.3, 8.1.3.1 & 9 BS EN ISO 15630-1: 2002 Cl. 5 BS EN ISO 15630-2: 2002 Cl. 5 CS2: 2012 (Rev. 6) Cl. 6.1 & 6.4

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Metallic materials (cont'd)	Tensile test of high tensile 7-wire strands in the force range 5 kN – 2000 kN	BS EN ISO 6892-1: 2019 Cl. 10.3.2 & 10.3.3 Method A & Method B, & BS EN ISO 15630-3: 2010 Cl. 5 in conjunction with the following specification(s): BS 5896: 1980 App. A BS 5896: 2012 Cl. 7.2.2
	Tensile test of metallic materials in the force range 2 kN – 2000 kN	BS 18: 1987 in conjunction with the following specification(s): BS 4360: 1986 Cl. 23 BS EN 10002-1: 2001 Cl. 10 BS EN ISO 6892-1: 2019 Cl. 10.3.3 Method B in conjunction with the following specification(s): BS 4360: 1990 + Amd. 6825 Cl. 23 BS EN 10025-1: 2004 Cl. 7.3.1, 9.2.3.2 & 10.2.1 BS EN 10210-1: 2006 Cl. 6.6.1, 9.2.1 & 9.2.2 BS EN 10219-1: 2006 Cl. 6.7.1, 9.2.1 & 9.2.2
	Tensile test of machined bolts and screws in the force range 50 kN – 2000 kN	BS EN 10002-1: 2001 BS EN ISO 6892-1: 2009 Cl. 10.4 Method B in conjunction with the following specification(s): BS 3692: 2001 Cl. 11 & 13 BS EN 20898-1: 1992 Cl. 8.1 BS EN ISO 898-1: 2013 Cl. 9.7
	Tensile test of unmachined bolts and screws in the force range 50 kN – 2000 kN	BS EN 10002-1: 2001 BS EN ISO 6892-1: 2009 Cl. 10.4 Method B in conjunction with the following specification(s): BS 3692: 2001 Cl. 11 & 13 BS EN 20898-1: 1992 Cl. 8.2 BS EN ISO 898-1: 2013 Cl. 9.2
	Proof load test of steel nuts in the force range 50 kN – 2000 kN	BS 3692: 2001 Annex C.1 BS EN 20898-2: 1994 Cl. 5-7 & 8.1 BS EN ISO 898-2: 2012 Cl. 9.1
	Performance test of fusion bonded epoxy coated carbon steel bars	BS 3900: Part C5: 1992 Method 6 BS 7295: Part 1: 1990 + Amd. 6955 Cl. 4 Hong Kong Housing Authority Specification Library (2018) CON3.T450.8 & CON3.T460.8 Hong Kong Housing Authority Specification Library (2022) CON3.T450.9 & CON3.T460.9

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Metallic materials (cont'd)	Tensile test & slip/permanent elongation test of mechanical coupler for reinforcing bar in the force range 2 kN - 2000 kN	BS EN ISO 6892-1: 2009 Cl. 10.4 Method B & ISO 15835-2: 2018 Cl. 5.4 excluding Cl. 5.4.4 in conjunction with the following specification(s): BS 8110: Part 1: 1997 Cl. 3.12.8.16.2 Buildings Department Code of Practice for Structural Use of Concrete (2004) Cl. 3.2.8.2 Buildings Department Code of Practice for Structural Use of Concrete (2013)Cl. 3.2.8.3 General specification for Civil Engineering Works (2006) Vol. 2 Cl. 15.35 General Specification for Civil Engineering Works (2020) Vol. 2 Cl. 15.35
	Static tension test, static compression test, cyclic tension & compression tests for mechanical connector systems (Type 2 Splice) for steel reinforcing bars in the force range 10 kN - 2000 kN	ICC Evaluation Service, Inc. AC133 (Approved May 2008, Effective 1 Jun 2008) Cl. 4.1.2 with modifications ICC Evaluation Service, Inc. AC133 (Approved Jan 2010, Effective 1 Jun 2010) Cl. 4.1.2 with modifications in conjunction with the following specification(s): Buildings Department Code of Practice for Structural Use of Concrete (2013) Cl. 3.2.8.4(b), (c) & (d)
	Weld shear force test of steel fabrics for reinforcement of concrete	BS EN ISO 15630-2: 2002 Cl. 7 ISO 10287: 1992 in conjunction with the following specification(s): BS 4483: 1985 Cl. 13.2 BS 4483: 1998 Cl. 13.2 BS 4483: 2005 Cl. 7.2.2 & 7.2.4
Pulverised-fuel ash (PFA)	Fineness	BS 3892: Part 1: 1982 App. D BS 3892: Part 1: 1997 Annex D
	Initial setting time	BS 3892: Part 1: 1997 Cl. 10
	Moisture content	BS 3892: Part 1: 1982 App. B BS 3892: Part 1: 1997 Annex C
	Particle density	BS 3892: Part 1: 1997 Cl. 7
	Soundness	BS 3892: Part 1: 1997 Cl. 11
	Strength factor	BS 3892: Part 1: 1997 Annex F
	Water requirement	BS 3892: Part 1: 1982 App. E BS 3892: Part 1: 1997 Annex E

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Pulverised fuel ash (Chemical analysis)	Loss-on-ignition	BS EN 196: Part 2: 1995 Cl. 7 (using 1 hr for ignition time)
	Aluminium oxide content (Al_2O_3)	BS EN 196: Part 2: 1995 Cl. 13.11
	Iron (III) oxide content (Fe_2O_3)	BS EN 196: Part 2: 1995 Cl. 13.10
	Calcium oxide content (CaO)	BS EN 196: Part 2: 1995 Cl. 13.12 (reference method)
	Magnesium oxide content (MgO)	BS EN 196: Part 2: 1995 Cl. 13.13 (reference method)
	Sulfate content (as SO_3)	BS EN 196: Part 2: 1995 Cl. 8
	Total silica content (SiO_2)	BS EN 196: Part 2: 1995 Cl. 13.9
	Pure silica content	BS EN 196: Part 2: 1995 Cl. 13.6
	Soluble silica content	BS EN 196: Part 2: 1995 Cl. 13.7 and Cl. 13.8
	Impure silica content	BS EN 196: Part 2: 1995 Cl. 13.2 & 13.3
	Chloride content	BS EN 196: Part 21: 1992 Cl. 4
	Total alkali content (equivalent Na_2O)	In-house method SMTP 003-CH(PF) 005 BS EN 196: Part 21: 1992 Cl. 7 (reference method)
Portland pulverized fuel ash cement (PPFAC) (Chemical analysis)	Loss-on-ignition (L.O.I.)	BS EN 196: Part 2: 1995 Cl. 7
	Proportion of PFA	In-house method SMTP003-CH(PC)-005
	Sulfate content (as SO_3)	BS EN 196: Part 2: 1995 Cl. 8
Road surfaces	Luminance coefficient under defuse illumination (Qd) and retro-reflected luminance (RL) of road markings	BS EN 1436: 1998 Annex A & B (excluding Annex B7) BS EN 1436: 2007 + A1: 2008 Annex A & B (excluding Annex B7)
	Skid resistance of road surfaces/markings using a portable pendulum tester	BS EN 1436: 1998 Annex D BS EN 1436: 2007 + A1: 2008 Annex D
	Thickness of road marking materials (by micrometer method)	BS 3262: Part 3: 1989 App. B

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Rock	Direct shear strength of jointed rock	International Society for Rock Mechanics (1981) Part 2: Suggested method for determining direct shear strength with modifications ASTM D5607-95 with modifications ASTM D5607-02 (Reapproved 2006) with modifications
	Point load strength index of rock by diametral, axial, block and irregular lump tests	ASTM D5731-95 International Society for Rock Mechanics (1985) Suggested method for determining point load strength
	Water content of rock	ASTM D2216-98 with modifications
	Porosity and density of intact rock using saturation and buoyancy techniques	International Society for Rock Mechanics (1981) Part 1 Method 3: Suggested method for porosity/density determination using saturation and buoyancy techniques with modifications
	Porosity and density of intact rock using saturation and caliper techniques	International Society for Rock Mechanics (1981) Part 1 Method 2: Suggested method for porosity/density determination using saturation and caliper techniques with modifications
	Pulse velocities and ultrasonic elastic constants of intact rocks	International Society for Rock Mechanics (1981) Suggested method for determining sound velocity with modifications
	Schmidt rebound hardness of rocks	International Society for Rock Mechanics (1981) Part 3: Suggested method for determining Schmidt rebound hardness with modification
	Unconfined compressive strength of intact rock core specimens	ASTM D2938-95 with modifications ASTM D7012-07 with modifications
	Preparation of rock core specimens and determination of dimensional shape and tolerances	ASTM D4543-85 (Re-approved 1991) with modifications
	Particle size distribution of coarse grading of rock armour	BS EN 13383-2: 2002 Cl. 5 BS EN 13383-2: 2013 Cl. 5 General Specification for Civil Engineering Works (2006) Vol. 1 Cl. 6.72(3)

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Rock (Cont'd)	Mass distribution of light and heavy gradings of rock armour	BS EN 13383-2: 2002 Cl. 6 (reference method) BS EN 13383-2: 2013 Cl. 6 (reference method)
	Dropping test of rock armour to determine the resistance to fracture	General Specification for Civil Engineering Works (2006) Vol. 2 Cl.21.97 (1) & (2) & Cl.21.99 (2)
Soil (Phase I)	Moisture content by oven-drying at 45˚C ± 5˚C	GEOSPEC 3: 2001 Test 5.1 GEOSPEC 3: 2017 Test 5.1
	Moisture content by oven-drying at 105˚C ± 5˚C	GEOSPEC 3: 2001 Test 5.2 GEOSPEC 3: 2017 Test 5.2
	Comparative test for the determination of moisture content by oven-drying	GEOSPEC 3: 2001 Test 5.3 GEOSPEC 3: 2017 Test 5.3
	Liquid limit, plastic limit, and plasticity index	GEOSPEC 3: 2001 Test 6.1 GEOSPEC 3: 2017 Test 6.1
	Liquidity index	GEOSPEC 3: 2001 Test 6.2 GEOSPEC 3: 2017 Test 6.2
	Particle density by gas jar method	GEOSPEC 3: 2001 Test 7.1 GEOSPEC 3: 2017 Test 7.1
	Particle density by small pyknometer method	GEOSPEC 3: 2001 Test 7.2 GEOSPEC 3: 2017 Test 7.2
	Particle size distribution by wet sieving (with dispersant)	GEOSPEC 3: 2001 Test 8.1 GEOSPEC 3: 2017 Test 8.1
	Particle size distribution by wet sieving (without dispersant)	GEOSPEC 3: 2001 Test 8.2 GEOSPEC 3: 2017 Test 8.2
	Particle size distribution by hydrometer (with dispersant)	GEOSPEC 3: 2001 Test 8.5 GEOSPEC 3: 2017 Test 8.5
	Particle size distribution by hydrometer (without dispersant)	GEOSPEC 3: 2001 Test 8.6 GEOSPEC 3: 2017 Test 8.6
	Construction of a continuous particle size distribution curve from the results of wet-sieving and sedimentation tests	GEOSPEC 3: 2001 Test 8.7 GEOSPEC 3: 2017 Test 8.7

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Soil (Phase I) (cont'd)	Dry density/moisture content relationship of soils containing particles which are not susceptible to crushing (using a 1000cc mould and 2.5 kg rammer)	GEOSPEC 3: 2001 Test 10.1 GEOSPEC 3: 2017 Test 10.1
	Dry density/moisture content relationship of soils containing particles which are susceptible to crushing (using a 1000cc mould and 2.5 kg rammer)	GEOSPEC 3: 2001 Test 10.2 GEOSPEC 3: 2017 Test 10.2
	Dry density/moisture content relationship of soils containing particles which are not susceptible to crushing (using a CBR mould and 2.5 kg rammer)	GEOSPEC 3: 2001 Test 10.3 GEOSPEC 3: 2017 Test 10.3
	Dry density/moisture content relationship of soils containing particles which are susceptible to crushing (using a CBR mould and 2.5 kg rammer)	GEOSPEC 3: 2001 Test 10.4 GEOSPEC 3: 2017 Test 10.4
	Dry density/moisture content relationship of soils containing particles which are not susceptible to crushing (using a 1000cc mould and 4.5 kg rammer)	GEOSPEC 3: 2001 Test 10.5 GEOSPEC 3: 2017 Test 10.5
	Dry density/moisture content relationship of soils containing particles which are susceptible to crushing (using a 1000cc mould and 4.5 kg rammer)	GEOSPEC 3: 2001 Test 10.6 GEOSPEC 3: 2017 Test 10.6
	Dry density/moisture content relationship of soils containing particles which are not susceptible to crushing (using a CBR mould and 4.5 kg rammer)	GEOSPEC 3: 2001 Test 10.7 GEOSPEC 3: 2017 Test 10.7
	Dry density/moisture content relationship of soils containing particles which are susceptible to crushing (using a CBR mould and 4.5 kg rammer)	GEOSPEC 3: 2001 Test 10.8 GEOSPEC 3: 2017 Test 10.8

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Soil (Phase I) (cont'd)	In-situ bulk density and in-situ dry density of soils by the sand replacement method suitable for fine- and medium-grained soils (with small pouring cylinder)	GEOSPEC 3: 2001 Test 11.1 GEOSPEC 3: 2017 Test 11.1
	In-situ bulk density and in-situ dry density of soils by the sand replacement method suitable for fine-, medium-, and coarse-grained soils (with large pouring cylinder)	GEOSPEC 3: 2001 Test 11.2 GEOSPEC 3: 2017 Test 11.2
	Relative compaction of fill material	GEOSPEC 3: 2001 Test 11.4 GEOSPEC 3: 2017 Test 11.4 Buildings Department PNAP APP-15 (2005) Cl. 4 App. A
	California Bearing Ratio (CBR)	GEOSPEC 3: 2001 Test 12.1 GEOSPEC 3: 2017 Test 12.1
	Density of soil by linear measurement method	BS 1377: Part 2: 1990 Cl. 7.2

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Soil (Phase II)	One-dimensional consolidation test	GEOSPEC 3: 2001 Test 14.1 GEOSPEC 3: 2017 Test 14.1
	Isotropic compression test in a triaxial cell	GEOSPEC 3: 2001 Test 14.2 GEOSPEC 3: 2017 Test 14.2
	Unconsolidated undrained triaxial compression test without pore pressure measurement	GEOSPEC 3: 2001 Test 15.1 GEOSPEC 3: 2017 Test 15.1
	Isotropically consolidated undrained triaxial compression test with pore pressure measurement	GEOSPEC 3: 2001 Test 15.2 GEOSPEC 3: 2017 Test 15.2
	Isotropically consolidated undrained triaxial compression test with pore pressure measurement for loosely compacted fill materials (with use of carbon dioxide for sample saturation)	GEOSPEC 3: 2001 Test 15.2 with modifications GEOSPEC 3: 2017 Test 15.2 with modifications
	Isotropically consolidated drained triaxial compression test with measurement volume change	GEOSPEC 3: 2001 Test 15.3 GEOSPEC 3: 2017 Test 15.3
	Direct shear test (small shear box apparatus)	GEOSPEC 3: 2001 Test 16.1 GEOSPEC 3: 2017 Test 16.1
	Unconfined compressive strength of cohesive soil by load frame method	BS 1377: Part 7: 1990 Cl. 7
	Shear strength of cohesive soil by laboratory vane method	BS 1377: Part 7: 1990 Cl. 3

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Soil (other)	Resistivity of soil by disc electrode method	BS 1377: Part 3: 1990 Cl. 10.2
	GCO probe test	General Specification for Civil Engineering Works (2006) Vol. 1 App. 7.1 GEOGUIDE 2:2017 Section 23 (dynamic probing)
	Pull-out test of soil nails	GEO Particular Specification for soil nail pull out test (2004) CL. 7.229A1 General Specification for Civil Engineering Works (2006) Vol. 1 Cl. 7.138
	Permeability by falling-head or constant-head method (with permeameter of model Nanjing-55)	CN SD128-84 with modifications
	Time domain reflectometry (TDR) test on soil nails	GEO Guidelines on Test Procedure using Time Domain Reflectometry (TDR) to determine the length of installed soil nails (July 2007)

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Soil (Chemical analysis)	Organic matter content	BS 1377: Part 3: 1990 Cl. 3 GEOSPEC 3: 2001 Cl. 9.1 GEOSPEC 3: 2017 Cl. 9.1
	Mass loss on ignition	BS 1377: Part 3: 1990 Cl. 4 GEOSPEC 3: 2001 Cl. 9.2 GEOSPEC 3: 2017 Cl. 9.2
	Water-soluble chloride content	BS 1377: Part 3: 1990 Cl. 7.2 GEOSPEC3: 2001 Cl. 9.4 GEOSPEC3: 2017 Cl. 9.4
	Acid-soluble chloride content	BS 1377: Part 3: 1990 Cl. 7.3
	pH value	BS 1377: Part 3: 1990 Cl. 9 GEOSPEC3: 2001 Cl. 9.5 GEOSPEC3: 2017 Cl. 9.5
	Water-soluble sulphate content	BS 1377: Part 3: 1990 Cl. 5 *Excluding* Cl. 5.6 GEO Report No. 36: Test 3.5.5: 1996 GEOSPEC 3: 2001 Cl. 9.3 GEOSPEC 3: 2017 Cl. 9.3
	Acid-soluble sulphate content	BS 1377: Part 3: 1990 Cl. 5 *Excluding* Cl. 5.6 GEO Report No. 36 Test 3.5.5: 1996 GEOSPEC 3: 2001 Cl. 9.3
	Total sulphate content	GEOSPEC 3: 2017 Cl. 9.3
Structural fixings	Tensile proof load test of anchors by incremental loading in the force range 5 kN – 500 kN	BS 5080: Part 1: 1993 Cl. 6, 7.1.1 & 7.1.3 with modifications
	Tensile proof load test of drilled-in anchors used for cantilevered structure/hanger/curtain wall remedial works by incremental loading in the force range 5 kN – 500 kN	Buildings Department PNAP APP-169 (Oct 2023) App. A
	Tensile proof load test of drilled-in anchors used for works other than cantilevered structure/ hanger/curtain wall remedial works in the force range 5 kN – 500 kN	Buildings Department PNAP APP-169 (Oct 2023) App. B
	Tensile proof load test for cementitious or polymer based grouted bolts or dowels or reinforcing bars works in the force range 5 kN – 600 kN	Buildings Department PNAP APP-169 (Oct 2023) App. C

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Construction Materials 建築材料		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
	Elemental composition:-	
Steel (Chemical analysis)	Total carbon content	BS EN ISO 15350: 2010 (Method A) ISO 15350: 2000 (Method A)
	Total sulphur content	BS EN ISO 15350: 2010 (Method A) ISO 15350: 2000 (Method A)
	Nitrogen content	BS EN ISO 15351: 2010 ISO 15351: 1999
	Copper, Chromium, Manganese, Nickel, Molybdenum, Phosphorus, Vanadium	In-house method SMTP003-CH(ST)-004 (ICP-OES)
Low alloy steel (Chemical analysis)	Carbon equivalent value	CS2: 2012 Cl. 1.5.1 BS 4449:2005 + A2:2009 Cl. 7.1
Stainless steel (Co content up to 0.5 %) (Chemical analysis)	Nickel	ASTM E353-2019 Cl. 172-179 (dimethylglyoxime gravimetric method) ***<Excluding the following>*** Cl. 173.2, 175.1, 176.2 and 177.2
Stainless steel (Chemical analysis)	Chromium	ASTM E353-2019 Cl. 212-220 (peroxydisulfate oxidation and back titration with potassium permanganate) ***<Excluding the following>*** Cl. 216.3, 217.2, 217.3, 218.9, 218.10, 219.2
	Silica	In-house method SMTP003-CH(ST)-010 (ICP-OES)
	Aluminium, Copper, Manganese, Molybdenum, Phosphorus, Titanium, Vanadium	In-house method SMTP003-CH(ST)-011 (ICP-OES)

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	Elemental composition:-	
Iron (Chemical analysis)	Total carbon content	BS EN ISO 15350: 2010 (Method A) ISO 15350: 2000 (Method A)
	Total sulphur content	BS EN ISO 15350: 2010 (Method A) ISO 15350: 2000 (Method A)
	Nitrogen content	BS EN ISO 15351:2010 ISO 15351: 1999

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Water (Chemical analysis)	Total alkalinity	APHA 20e 2320B
	Chloride content	APHA 20e 4550 Cl B BS EN 1008: 2002 Cl. 6.1.3 & BS EN 196-21: 1992 Cl.4
	Sulphate content	BS 1377: Part 3: 1990 Cl. 5 *Excluding* Cl. 5.6 BS EN 1008: 2002 Cl. 6.1.3 & BS EN 196-2: 1995: Cl. 8
	Total dissolved solids dried at 180ºC	APHA 20e 2540C
	Acid-soluble alkali content (equivalent Na_2O)	In-house method SMTP003-CH(WC)007
	Alkali content	BS EN 1008: 2002 Cl. 6.1.3 & BS EN 196-21: 1992 Cl. 7 (reference method)

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Environmental Testing 環境測試		
ITEM TESTED OR MEASURED 測試或量度項目	**SPECIFIC TEST OR PROPERTY MEASURED** 特定測試或量度的特性	**SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED** 規範、標準方法或應用技術
Water and Wastewater	Physical examination :-	
	- pH value	In-house Method SMTP003-CH(EN)003
	- Total suspended solids dried at 103°C to 105°C	APHA 20e 2540 D (Gravimetric)
	Organic pollutants :-	
	- Chemical oxygen demand	APHA 20e 5220 B (Open reflux)
	Non-metallic constituents :-	
	Chloride Nitrite Nitrate ortho-Phosphate Sulfate	ASTM D4327-17 (Suppressed Ion Chromatography) ***<Excluding the following>*** Cl. 9.1