



No. 015

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服務對象 公眾**ACCREDITED TEST CATEGORIES** : Calibration Services 校正服務
認可測試類別 Construction Materials 建築材料
Environmental Testing 環境測試**SCOPE OF ACCREDITATION** : As shown on the following pages 詳見後頁
認可範圍

Fugro Technical Services Limited
輝固土力工程及檢測有限公司

MaterialLab Division			
Main Laboratory			
TEST CATEGORY 測試類別	ITEMS, MATERIALS OR PRODUCTS TESTED 測試項目、材料或產品	SPECIFIC TESTS OR PROPERTIES MEASURED 特定測試或量度的特性	CALIBRATION AND MEASUREMENT CAPABILITY* 校準和測量能力*
CALIBRATION SERVICES 校正服務	Construction materials testing equipment		
	- Cement grout flow cones	ASTM C939-97 Clause 8	
	- Compacting bars	Dimensional requirement and tolerance CS1 : 1990 : Vol. 1 Appendix A9	
	- Concrete test cube moulds	Dimensional requirement and tolerances CS1 : 1990 : Vol. 1 Appendix A21 - excluding surface texture measurement	
	- Curing tanks	Temperature distribution test Efficiency of circulation	± 0.4°C
	- Nuclear densometer / nuclear density gauge	Calibration of nuclear densometer / nuclear density gauge in accordance with ASTM D 2922 – 96, Cl. A1 over the following range : 1160 kg/m ³ to 2987 kg/m ³	0.68 % or 7.9 kg/m ³
		Calibration of nuclear densometer / nuclear density gauge in accordance with in-house procedure R-C-242 over the following range : 1160 kg/m ³ to 2987 kg/m ³	0.68 % or 7.9 kg/m ³
	- Rebound hammer	Checking of rebound value on the calibration anvil in accordance with BS EN 12504-2 : 2001 Checking of friction rider in accordance with method R-C-174	
	- Slump cones	Dimensional requirement and tolerance CS1 : 1990 : Vol. 1 Appendix A4	
	- Tamping rods	Dimensional requirement and tolerance CS1 : 1990 : Vol. 1 Appendix A5	

* THE CALIBRATION UNCERTAINTY OF A DEVICE UNDER TEST IS USUALLY REPORTED AT 95% CONFIDENCE LEVEL AND DEPENDS ON BOTH THE CMC OF THE LABORATORY AND THE PERFORMANCE OF THE DEVICE DURING CALIBRATION.

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CALIBRATION SERVICES (cont'd) 校正服務(續上)	Construction materials testing equipment (cont'd)	Calibration of perforated test sieves with size greater than 4 mm in accordance with the specification requirement in table 3 of BS 410 : 1986 and table 1 & 2 of BS 410-2 : 2000 / ISO 3310-2 : 1999 in aperture size, pitch of hole, bridge width and plate thickness	$\pm 0.05 \text{ mm}$
	- Test sieve	Calibration of woven wire test sieves with size greater than 4 mm in accordance with the specification requirement in table 2 of BS 410 : 1986 and table 1 of BS 410-1 : 2000 / ISO 3310-1 : 2000 in wire diameter and aperture size	$\pm 0.05 \text{ mm}$
	Mass measurements	Calibration of single pan balances in accordance with in-house method R-C-082 over the following range:- up to 61 kg	$2(\sigma^2 + \sigma_1^2/k)^{0.5}$ Dependent on quality, construction and performance of the balance, where σ = standard uncertainty of the calibrating masses σ_1 = balance repeatability - (standard deviation) k = no. of readings used to make the measurement (k = 2 for double weighing)
	- Balances		Standard weights of OIML Class E1 (1 mg to 200 g) and Class F1 (1 mg to 20 kg) are available

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CALIBRATION SERVICES (cont'd) 校正服務(續上)	Mechanical metrology measurements - Dimensional measurements - Calipers up to 300 mm - digital type - vernier type - Coating thickness gauge - Dial gauges up to 80 mm - External micrometers up to 50 mm - Extensometers - Micrometer head - Feeler gauges - 0.02 mm to 1.00 mm - Linear displacement measuring devices - Steel rulers up to 1000 mm	Calibration in accordance with in-house method R-C-190 Checking of accuracy of reading in accordance with in-house method R-C-094 over the following range : up to 50 μm above 50 μm to 758 μm Calibration in accordance with in-house method R-C-187 up to 5 mm 5 mm to 10 mm 10 mm to 25 mm 25 mm to 50 mm 50 mm to 100 mm Calibration in accordance with in-house method R-C-189 Calibration in accordance with in-house method R-C-257 (use of calibration rig) BS 3846 : 1970 Calibration in accordance with in-house method R-C-259 - up to 50 mm Calibration in accordance with in-house method R-C-194 Calibration in accordance with in-house method R-C-192 up to 1 mm 1 mm to 25 mm above 25 mm to 50 mm above 50 mm to 100 mm Calibration in accordance with in-house method R-C-185	15 μm 25 μm 0.5 μm 1.0 % 5.2 μm 5.8 μm 8.9 μm 14 μm 25 μm 1.2 μm Grade D gauge length not less than 25 mm Class 1 3 μm 2.6 μm 1 μm 2 μm 2 μm 20 μm 0.24 mm

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CALIBRATION SERVICES (cont'd) 校正服務(續上)	Mechanical metrology measurements (cont'd)		
	- Force testing machines		
	- Compression	Universal testing machines in compression in accordance with BS 1610 : Part 1 : 1992 (True force method)	Grade 0.5 in the range 10 kN - 50 kN, 200 kN - 3000 kN Grade 1.0 in the range 0.1 kN - 3000 kN
		Concrete testing machines in compression in accordance with BS 1610 : Part 1 : 1992 CS1 : 1990 Appendix D (True force method)	Grade 0.5 in the range 10 kN - 50 kN, 200 kN - 500 kN Grade 1.0 in the range 0.1 kN - 3000 kN
		Concrete testing machines in compression in accordance with BS EN 12390-4 : 2000 (True force method)	Grade 1.0 in the range 0.1 kN - 3000 kN
	- Tension	Force testing machine in accordance with BS 1610 : Part 1 : 1985	Grade 1.0 in the range 0.1 kN - 50 kN
	- Stability	Stability testing of compression machines in accordance with BS 1881 : Part 115 : 1986 (AMD 6536) CS1 : 1990 Appendix D BS EN 12390-4 : 2000	
- Marshall testing machine	Marshall testing machine (Force) in compression in accordance with BS 1610 : Part 1 : 1992 (True force method)	Grade 1.0 in the range 0.1 kN - 25 kN	
	Marshall testing machine (flow)	In-house Method R-C-109 Up to 10 mm	
- Impact testing machine	Calibration of pendulum impact testing machine in accordance with BS EN 10045-2 : 1993 : Clause 6	± 6.5 Joules at 30 Joules ± 7.4% at 120 Joules	

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CALIBRATION SERVICES (cont'd) 校正服務(續上)	Mechanical metrology measurements (cont'd)		
	- Force and pressure measurements		
	- Force measuring device for site tests	Calibration of load cell with hydraulic jack in accordance with in-house method R-C-222 over the following ranges : 5 kN – 50 kN over 50 kN – 500 kN	± 1.4 % of measure load ±1.3 % of measure load
		Calibration of load cell, proving ring, and column without hydraulic jack in accordance with in-house method R-C-222 over the following ranges : 5 kN – 50 kN over 50 kN – 500 kN	±1.4 % of measure load ±1.3 % of measure load
	- Hydraulic pressure gauges and pressure transducers	Calibration of gauge pressure in accordance with in-house method R-C-186 over the following ranges;_ 5 bar – 10 bar over 10 bar to 90 bar over 90 bar to 600 bar over 600 bar to 950 bar	0.16 % to 0.26 % of reading 0.5 % to 4.5 % of reading 0.27 % to 3.3 % of reading 1.2 % to 1.9 % of reading
	- Pressure measuring instruments	Calibration of pressure measuring instruments in accordance with GEOSPEC 3 : 2001 over the following range : 20 kPa – 1000 kPa	0.14 %
		Calibration of pressure measuring instruments by direct comparison in accordance with in-house method R-C-258 100 kPa – 1500 kPa 5 bar – 40 bar 10 bar – 700 bar	0.3 % 0.6% 0.3 %
	- Proving rings / columns	Calibration in accordance with GEOSPEC 3 over the following range : 1 kN to 20 kN above 20 kN to 50 kN above 50 kN to 500 kN	± 0.21% ± 0.5% ± 0.6%

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CALIBRATION SERVICES (cont'd) 校正服務(續上)	Mechanical metrology measurements (cont'd)		
	- Hardness measurement		
	- Hardness testing machine	Indirect verification of hardness testing machine in accordance with BS EN ISO 6507-2 over the following Vicker Scales: HV10, HV30	
	- Survey instruments		
	- Digital level instrument	Calibration of digital level instrument in accordance with in-house method R-C-247	0.07 mm
	- Engineering survey staff	Calibration of engineering survey staff in accordance with in-house method R-C- 253 over the following range :	
		up to 5 m	0.8 mm
	- Optical level instrument	Calibration of optical level instrument in accordance with R-C-248	0.15 mm
	- Volume measurement		
	- Volume change apparatus	Calibration of volume change apparatus in accordance with method R-C-179	
	volume change	0.04 ml	
	Temperature measurements		
- Furnace	Calibration of temperature distribution in accordance with in-house method R-C-164		
		400 °C to 600 °C	2.8 °C
		above 600 °C to 1200 °C	5.4 °C

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CALIBRATION SERVICES (cont'd) 校正服務(續上)	- Temperature measurements (cont'd)	Calibration of temperature in accordance with in-house method R-C-231	-20°C to 0°C	0.4 K
			-20°C to 30°C	0.2 K
			0°C to 80°C	0.2 K
			80°C to 250°C	0.4 K
	- Electronic and dial thermometers with digital or analogue display	Calibration of temperature in accordance with in-house method R-C-232	-20°C to 0°C	0.4 K
			-20°C to 30°C	0.4 K
			0°C to 80°C	0.4 K
			80°C to 250°C	0.5 K
	- digital	Calibration of temperature in accordance with in-house method R-C-234	-20°C to 0°C	0.4 K
			-20°C to 30°C	0.3 K
			0°C to 80°C	0.3 K
			80°C to 250°C	0.4 K
- analogue	Calibration of temperature in accordance with in-house method R-C-231	-20°C to 0°C	0.4 K	
		-20°C to 30°C	0.2 K	
		0°C to 80°C	0.2 K	
		80°C to 250°C	0.4 K	
- Liquid-in-glass thermometers		-20°C to 0°C	0.4 K	
		-20°C to 30°C	0.3 K	
		0°C to 80°C	0.3 K	
		80°C to 250°C	0.4 K	
- Platinum resistance thermometers		-20°C to 0°C	0.4 K	
		-20°C to 30°C	0.2 K	
		0°C to 80°C	0.2 K	
		80°C to 250°C	0.4 K	

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CONSTRUCTION MATERIALS 建築材料	Admixtures	Water reduction	BS EN 934-2 : 2001 Table 2(1), 3.1(1), 10(3), 11.1(3) & 12(3)
		Increase in consistence	BS EN 934-2 : 2001 Table 3.2(1)
		Retention of consistence	BS EN 934-2 : 2001 Table 3.2(2) & 11.2(1)
		Compression strength	BS EN 934-2 : 2001 Table 2(No. 2), 3.1(2), 3.2(3), 4(2), 5(3), 6(2), 7(1), 8(2), 9(2), 10(1), 11.1(1), 11.2(2) & 12(1)
		Air content test	BS EN 934-2 : 2001 Table 2(3), 3.1(3), 3.2(4), 4(3), 5(3), 6(3), 7(2), 8(3), 9(3), 10(4), 11.1(4), 11.2(3) & 12(4)
		Bleeding test	BS EN 934-2 : 2001 Table 4(1)
		Setting time	BS EN 934-2 : 2001 Table 6(1), 8(1), 10(2), 11.1(2) & 12(2)
		Capillary absorption	BS EN 934-2 : 2001 Table 9(1)
	Admixtures (Chemical analysis)	Ash content	BS 5075 : Part 1 : 1982 (AMD 4910) Appendix D.2
		Chloride content	BS 5075 : Part 1 : 1982 (AMD 4910) Appendix E
		Dry material content	BS 5075 : Part 1 : 1982 (AMD 4910) Appendix D.1
		pH value	In-house Method C-T-054
		Relative density (liquid)	BS 5075 : Part 1 : 1982 (AMD 4910) Appendix D.3
	Adhesive	Acid-soluble alkali content (equivalent Na ₂ O)	In-house Method C-T-124
		Pull-off test for tile adhesive	In-house method T-T-051

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Aggregates	Accelerated mortar-bar test method for the assessment of the alkali reactivity of aggregate	D/MTRC/NW/CIV/M&W/011/A Appendix 11.8
		Aggregate crushing value	BS 812 : Part 3 : 1975 (AMD 2153 & 4616) BS 812 : Part 110 : 1990
		Aggregate impact value	BS 812 : Part 3 : 1975 (AMD 4616) BS 812 : Part 112 : 1990 (AMD 8772)
		Bulk density	BS 812 : Part 2 : 1975 (AMD 4615)
		Bulk density, voids and bulking	BS 812 : Part 2 : 1995
		Compacting fraction value of aggregates for granular bed	General Specification for Civil Engineering Works Edition 1992 : Appendix 5.2 HKHA Specification Library Edition 2000 DIS 3.T240.3 to DIS 3.T270.3 HKHA Specification Library Edition 2004 DRA2.T250.4 to DRA2.T290.4
		Clay, silt and dust content	BS 812 : Part 1 : 1975 (AMD 4875) (Decantation method)
		Detection of potential alkali-reactivity of aggregates – ultra-accelerated mortar-bar test	RILEM TC 106-2 : 2000
		Determination of foreign materials content in recycled aggregates	HKHA/MTS (2006/2008) Package A Part D Cl. 1.5.2
		Elongation index	BS 812 : Part 1 : 1975 (AMD 4572) BS 812 : Section 105.2 : 1990
		Flakiness index	BS 812 : Section 105.1 : 1989
		Moisture content	BS 812 : Part 2 : 1975 (AMD 4615) BS 812 : Part 109 : 1990 (Oven drying method)
		Particle densities and water absorption	BS 812 : Part 2 : 1995 (AMD 9195) (Gas jar method)
Particle size distribution	BS 812 : Section 103.1 : 1985 (AMD 6003) (Sieve analysis)		
Potential alkali reactivity of aggregates (mortar-bar method)	ASTM C1260-94		

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Aggregates (cont'd)	Relative density and water absorption	BS 812 : Part 2 : 1975 (AMD 4615) (Gas jar method)
		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
		Shell content	BS 812 : Part 106 : 1985
		Ten per cent fines value	BS 812 : Part 111 : 1990 BS 812 : Part 3 : 1975 (AMD 4616)
	Aggregates (Site tests)	Sampling	BS 812 : Part 102 : 1989
		Aggregates (Chemical analysis)	Water-soluble chloride salts
	Total sulphate content by acid extraction		BS 812 : Part 118 : 1988 Cl. 6 <i>Excluding</i> Cl. 4
	Acid-soluble material		BS 812 : Part 119 : 1985 <i>Excluding</i> Cl. 4
	Soundness		BS 6349 : Part 1 : 1984 Appendix B BS 812 : Part 121 : 1989
	Potential reactivity		ASTM C289 - 87 <i>Excluding</i> Cl. 9 and 14.4 ASTM C289 - 94 <i>Excluding</i> Cl. 8
	Soluble silica content (SiO ₂)		HKHA/MTS (2006/2008) Specification, Part D Cl. 1.4.9
	Soluble calcium oxide content (CaO)		HKHA/MTS (2006/2008) Specification, Part D Cl. 1.4.9
	Anchor bolts/bars	In-situ tensile proof load test (bolts) in the force range 6 kN – 500 kN	In-house Method T-T-052
		In-situ tensile proof load test (steel bars) in the force range 6 kN – 500 kN	In-house Method T-T-055

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Blocks & Bricks	Compressive strength of clay bricks	BS 3921 : 1985, Appendix D
		Compressive strength of interlocking Blocks	GS for Civil Engineering Work 1992 Edition App. 11.1 HKHA Specification (1998), RAP3.T010.2 to T060.2 HKHA Specification (2000), RAP3.T010.3 to T060.3 HKHA Specification (2004),EXT3.T110.4 to T160.4
		Compressive strength of precast concrete masonry unit	BS 6073 : Part 1 : 1981, Appendix B Amd. 4462
		Compressive strength of precast concrete paving blocks	BS 6717 : Part 1 : 1993, Annex A & B
		Determination of skid resistant value of pavers	BS 6677 : Part 1 : 1986 Appendix E
		Determination of water absorption properties of masonry units and segmental pavers	AS/NZS 4456.14 : 14 1997
		Determination of work size dimensions of clay and calcium silicate pavers	BS 6677 : Part 1 : 1986, Appendix C
		Dimensions check of clay bricks	BS 3921 : 1985, Appendix A
		Measurement of the dimension of paving block	BS 6717 : 2001, Annex B
		Measurement of the dimension of paving flag	BS 7263 : Part 1 : 2001, Annex B
	Bituminous materials	Transverse breaking load of clay and Calcium silicate pavers	BS 6677 : Part 1 : 1986, Appendix D
		Transverse strength of precast concrete blocks	BS 6073 : Part 1 : 1981, Appendix C Amd. 4462
		Aggregate grading	ASTM C117 - 87 ASTM C117 - 95 ASTM C136 - 84a with modification ASTM C136 - 96a with modification
		Bulk specific gravity and density of compacted specimens	ASTM D2726 - 96a, Method 9.1 ASTM D2726 - 88, Method 9.1
		Determination of air voids content of bituminous specimens	BS EN 12697-8 :2003

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Bituminous materials (cont'd)	Determination of binder content and aggregate grading of bituminous samples Determination of bulk density of compacted bituminous specimens (saturated surface dry) Determination of percentage air voids in compacted bituminous paving mixtures Determination of needle penetration of bituminous materials Determination of penetration of bituminous materials Determination of permeability of friction course material Determination of rate of spread of binder Determination of size and spacing of runway surface grooving Determination of softening point of bitumen (Ring and ball) Determination of softening point of bitumen (Ring-and-ball apparatus) Measurement of density, stability and flow of bituminous mixtures using Marshall Apparatus Measurement of density of cores from compacted asphalt layers Method of test for resistance of compacted asphalt mixtures to moisture induced damage Quantitative extraction of bitumen from bituminous paving mixtures Reduction of bituminous materials to testing Size Solubility of asphalt materials in methylene chloride	BS 598-102 : 1996 Method 5.2 (Incorporating Amendment No.1) BS EN 12697-6 : 2003 Procedure B ASTM D3203-88 ASTM D3203-94 BS 2000 : Part 49 : 1993 : Petroleum and its products, penetration of bituminous materials ASTM D5 – 05a General specification for civil engineering works : Volume 2 : 1992, Appendix 9.1 BS EN 12272-1 : 2002 (E) In-house method A-T-035 BS 2000 : Part 58 : 1993 Softening Point of Bitumen (Ring and ball) ASTM D36 – 95 (Re-approved 2000) ASTM D1559-89 excluding mix-design process BS 598 : Part 104 : 1989 Method 4 AASHTO T283 – 89 (1993) AASHTO T283 - 02 ASTM D2172 – 95 (Method A using ashing method) ASTM D2172 - 88 (Method A using ashing method) ASTM C702-98 ASTM D2042 - 97 with modification < excluding referee test >

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Bituminous materials (cont'd)	Theoretical maximum specific gravity of bituminous paving mixtures	ASTM D2041-95 (Weighing in water method using type A container) ASTM D2041-78 (Weighing in water method using type A container)
	Cement and Portland pulverized fuel ash cement	Compressive strength of broken mortar prism in the force range 6 kN - 250 kN Compressive strength of concrete cubes in the force range 50 kN - 2000 kN Compressive strength of mortar cubes in the force range 50 kN - 2000 kN Flexural strength of mortar prism in the force range 2 kN - 50 kN Density False set Fineness Setting times Soundness Standard consistence	BS EN 196-1 : 1995 BS 4550 : Part 3 : Section 3.4 : 1978 (AMD 4247, 4498 & 5704) with modification BS 4550 : Part 3 : Section 3.4 : 1978 (AMD 4247, 4498 & 5704) BS EN 196-1 : 1995 BS 4550 : Part 3 : Section 3.2 : 1978 BS EN 196-6 : 1992 Annex NC In-house Method K-T-059 BS 4550 : Part 3 : Section 3.3 : 1978 (AMD 4387 & 5703) (Using the method stated in Appendix D of BS 4359 : Part 2 : 1982) BS EN 196-6 : 1992 Annex NB (Using Blaine Method) BS 4550 : Part 3 : Section 3.6 : 1978(AMD 5706) BS EN 196-3 : 1995 Cl. 6 BS 4550 : Part 3 : Section 3.7 : 1978 (AMD 5707) BS EN 196-3 : 1995 Cl. 7 BS 4550 : Part 3 : Section 3.5 : 1978 (AMD 5705) BS EN 196-3 : 1995 Cl. 5
	Cement and Portland pulverized fuel ash cement (Site tests)	Sampling	BS 4550 : Part 1 : 1978 BS EN 196 - 7 : 1992

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Cement (Chemical Analysis)	Heat of hydration	BS 4550 : Part 3 : Section 3.8 : 1978 with modification
		Sample preparation	BS 4550 : Part 2 : 1970 Cl. 1.2.1
		Chloride content (Cl ⁻)	BS EN 196 : Part 21 : 1992 Cl. 4
		Insoluble residue content	BS EN 196 : Part 2 : 1995 Cl. 9
		Loss-on-ignition (L.O.I.)	BS EN 196 : Part 2 : 1995 Cl. 7
		Sulphate content (as SO ₃)	BS EN 196 : Part 2 : 1995 Cl. 8
		Acid-soluble alkali content (equivalent Na ₂ O)	In-house Method C-T-101
	Concrete	Accelerated curing of test specimens	BS 1881 : Part 112 : 1983 (AMD 6100) (method 55°C)
		Air content of fresh concrete	CS1 : 1990 Section 6 (AMD 1101 & 1102)
		Air content test	BS EN 12350-7 : 2000
		Assessment of the cement, aggregates and water contents of fresh concrete	DD 83 : 1983 Section 3 BS 1881 : Part 128 : 1997 Annex A (Buoyance method)
		Bleeding of concrete	ASTM C232-99 (Method A)
		Bleeding test	BS EN 480-4 : 1997
		Capillary absorption	BS EN 480-5 : 1997
		Compressive strength of cores in the force range 50 kN - 3000 kN	BS 1881 : Part 120 : 1983 (AMD 6109) CS1 : 1990 Section 15 (AMD 1201, 1203 & 1205)
		Compressive strength of cubes in the force range 50 kN - 3000 kN	BS 1881 : Part 116 : 1983 (AMD 6097 & 6720) CS1 : 1990 Section 12 (AMD 1201, 1202 & 1203)
		Compressive strength	BS EN 12390-3 : 2002
		Consistence of mortar	BS EN 413-2 : 2005 Clause 5
		Curing of test specimens (Tropical zone temperature)	BS 1881 : Part 111 : 1983 (AMD 6102 & 9387) CS1 : 1990 Section 10 (AMD 1101)

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Concrete (con'd)	Density of fresh concrete Density of hardened concrete Determination of air content of fresh concrete Determination of flow Electrical indication of concrete's ability to resist chloride ion penetration Flexural strength of beams in the force range 5 kN – 50 kN Flow table test Making of test beams from fresh concrete Making of test specimens (beams) Making of test specimens (cubes) Making of test specimens (cylinders) Making and curing test specimen Mixing and sampling of fresh concrete Mixing of concrete and mortar Moisture content (Weighing drilling powders)	BS 1881 : Part 107 : 1983 (AMD 6085 & 6722) CS1 : 1990 Section 5 (AMD 1101) BS EN 12350-6 : 2000 (AMD 11077) BS 1881 : Part 114 : 1983 (AMD 6098 & 6721) CS1 : 1990 Section 16 (AMD 1201 & 1203) CS1 : 1990 Section 6 (AMD 1101 & 1102) BS 1881 : Part 105 : 1984 (AMD6087) CS1 : 1990 Section 22 (AMD 1206) AASHTO T277 - 93 ASTM C1202 – 91 ASTM C1202 - 97 ASTM C1202-05 ASTM C1202-07 BS 1881 : Part 118 : 1983 (AMD 6095) CS1 : 1990 Section 14 (AMD 1201) BS EN 12350-5 : 2000 (AMD 11078) CS1 : 1990 Section 8 (AMD 1101 & 1102) CS1 : 1990 Section 8 (AMD 1101) BS 1881 : Part 108 : 1983 (AMD 6105) CS1 : 1990 Section 7 (AMD 1101 & 1102) CS1 : 1990 Section 9 (AMD 1101 & 1102) BS EN 12390-2 : 2000 (AMD 14343) BS 1881 : Part 125 : 1986 (AMD 6107) CS1 : 1990 Section 11 (AMD 1201) BS EN 480-1 : 2006 HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.3.8 (Method 1) HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.3.8 (Method 1)

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Concrete (con'd)	Moisture content (Weighing minicores) Moisture content (Speedy moisture tester) Removal of concrete/mortar in inspection core Setting time Slump test Stiffening time Tensile splitting strength of cylinders in the force range 50 kN – 3000 kN Water absorption Workability (Compacting factor) Workability (Slump)	HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.3.8 (Method 2) HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.3.8 (Method 2) HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.3.8 (Method 3) HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.3.8 (Method 3) HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.2.2 HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.2.2 BS EN 480-2 : 2006 BS EN 12350-2 : 2000 (AMD 11080) MTRC materials and workmanship specification Volume 2 of 6 : 1998, Cl. 11.40(9) BS 1881 : Part 117 : 1983 (AMD 6096) CS1 : 1990 Section 13 (AMD 1201, 1203 & 1204) BS 1881 : Part 122 : 1983 (AMD 6108) BS 1881 : Part 103 : 1983 CS1 : 1990 Section 3 (AMD 1101 & 1102) BS 1881 : Part 102 : 1983 (AMD 6090 & 6727) CS1 : 1990 Section 2 (AMD 1101 & 1102)

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Concrete (non-destructive testing)	Carbonation test	HKHA MTS Package D (06/08) Specification, Part D Cl. 4.3.1 (Method 1 and Method 2) HKHA MTS Package D (08/10) Specification, Part D Cl. 4.3.1 (Method 1 and Method 2)	
		Covermeter survey	HKHA MTS Package D (06/08) Specification, Part D Cl. 4.3.2 (Method 1 and Method 2) HKHA MTS Package D (08/10) Specification, Part D Cl. 4.3.2 (Method 1 and Method 2)	
		Half cell potential measurement	ASTM C876-91	
		Measurement of velocity of ultrasonic pulses in concrete	BS 1881 : Part 203 : 1986 Cl. 6 (Direct transmission)	
		Surface hardness testing by rebound hammer (type N)	BS 1881 : Part 202 : 1986 BS EN 12405-2 : 2001	
		Crack survey	HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.3.14 HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.3.14	
	Concrete (Site tests)	Curing of test specimens (Tropical zone temperature)	BS 1881 : Part 111 : 1983 (AMD 6102 & 9387) CS1 : 1990 Section 10 (AMD 1101)	
		Cutting out reinforcement	HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.2.3 HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.2.3	
		Determination of density of compacted fresh concrete	QSPSC Appendix C CS1 : 1990 Section 5 (AMD 1101)	
		Determination of flow	CS1 : 1990 Section 22 (AMD) 1206)	
		Determination of temperature of fresh concrete	BS 5328 : Part 4 : 1990 Cl. 3.4(b)	

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Concrete (Site tests) (con'd)	<p>Dry cutting mini-cores</p> <p>Making of test cylinder from fresh concrete</p> <p>Making of test specimens (cubes)</p> <p>Monitoring of setting time</p> <p>Obtaining core samples</p> <p>Obtaining drilling powder samples</p> <p>Removal of concrete cover to expose reinforcement</p> <p>Sampling of fresh concrete</p> <p>Workability (Slump)</p>	<p>HKHA/MTS Package D (06/08) Specification, Part D Cl. 6.2</p> <p>HKHA/MTS Package D (08/10) Specification, Part D Cl. 6.2</p> <p>CS1 : 1990 Section 9 (AMD 1101 & 1102)</p> <p>BS 1881 : Part 108 : 1983 (AMD 6105) CS1 : 1990 Section 7 (AMD 1101 & 1102)</p> <p>HKHA/MTS Package D (06/08) Specification, Part D Cl. 1.3.9</p> <p>CS1 : 1990 Section 15 (AMD 1201 & 1203)</p> <p>HKHA/MTS Package D (06/08) Specification, Part D Cl. 6.4</p> <p>HKHA/MTS Package D (08/10) Specification, Part D Cl. 6.4</p> <p>HKHA/MTS Package D (06/08) Specification, Part D Cl. 4.2.1</p> <p>HKHA/MTS Package D (08/10) Specification, Part D Cl. 4.2.1</p> <p>BS 1881 : Part 101 : 1983 (AMD 6091 & 6728) CS1 : 1990 Section 1 (AMD 1101) BS EN 12350-1 : 2000</p> <p>BS 1881 : Part 102 : 1983 (AMD 6090 & 6727) CS1 : 1990 Section 2 (AMD 1101 & 1102)</p>

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Concrete (Chemical analysis)	Treatment of samples Detection of PFA Cement and aggregate content (by CaO determination) Aggregate / cement ratio Chloride ion content Sulphate content Combined water content Capillary porosity Original water content Water / cement ratio Carbon dioxide content (Gasometric) pH value	BS 1881 : Part 124 : 1988 Cl. 4 CS1 : 1990 Section 21.4 CS1 : 1990 Section 21.5 BS 1881 : Part 124 : 1988 Cl. 5.4 & 5.9 CS1 : 1990 Section 21.6.4, 21.6.6 & 21.6.7 BS 1881 : Part 124 : 1988 Cl. 5.9 BS 1881 : Part 124 : 1988 Cl. 10.2 CS1 : 1990 Section 21.10.2 BS 1881 : Part 124 : 1988 Cl. 10.3 CS1 : 1990 Section 21.10.3 BS 1881 : Part 124 : 1988 Cl. 7.5 CS1 : 1990 Section 21.7.5.2 BS 1881 : Part 124 : 1988 Cl. 7.4 CS1 : 1990 Section 21.7.4 BS 1881 : Part 124 : 1988 Cl. 7 CS1 : 1990 Section 21.7 BS 1881 : Part 124 : 1988 Cl. 5 & 7 CS1 : 1990 Sections 21.6 and 21.7 CS1 : 1990 Section 21.10.4.2 In-house Method C-T-003

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Doors	Evenness	HKHA MTS (00/02) Specification, Part D Cl. 7.3.2, Test No. 2 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(g). Test 2
		Dimensional accuracy and squareness	BS 5278 : 1976 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(f). Test 1
		General flatness	BS 5277 : 1976 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(g). Test 2
		Test for determining behaviour of door leaves under humidity variation	BS 5369 : 1987 (BS EN 43) HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(h). Test 3
		Resistance to closing against an obstruction	HKHA Specification Library (SL) 2000 Edition : COM 8.T1210.3 to COM 8.T1220.3, Test 11 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(p). Test 11
		Resistance to jarring and vibration	HKHA Specification Library (SL) 2000 Edition : COM 8.T1010.3.3 to COM 8.T1030.3, Test 9 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(n). Test 9
		Strength in the plane of door leaf	HKHA Specification Library (SL) 2000 Edition : COM 8.T710.3 to COM 8.T750.3, Test 6 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(k). Test 6
		Resistance to impact (heavy body)	HKHA Specification Library (SL) 2000 Edition : COM 8.T1110.3 to COM 8.T1130.3, Test 10 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(o). Test 10
		Resistance to impact (hard body)	HKHA Specification Library (SL) 2000 Edition : COM 8.T510.3 to COM 8.T570.3, Test 4 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(i). Test 2
		Resistance to torsion	HKHA Specification Library (SL) 2000 Edition : COM 8.T610.3 to COM 8.T630.3, Test 5 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(j). Test 5

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Doors	Slamming closed	HKHA Specification Library (SL) 2000 Edition : COM 8.T910.3 to COM 8.T920.3, Test 8 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(m). Test 8
		Slamming open	HKHA Specification Library (SL) 2000 Edition : COM 8.T810.3 to COM 8.T820.3, Test 7 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(l). Test 7
	Foundation	Plate load tests	BS 1377 : Part 9 : Clause 1990 Clause 4.1 (Incremental loading method)
		Grout	Compressive strength of test cubes in the force range 50 kN - 3000 kN
	Flow of grout for preplaced-aggregate concrete		ASTM C939 - 97 ASTM C939-02
	Early change in height		ASTM C827-95a
	Setting time		ASTM C953-87 (Reapproved 1992)
	Changes in height		ASTM C1090-96
	Bleeding and free expansion		GS for Civil Engineering Works (1992), Cl. 17.60 HKHA Specification Library 2000 Cl. PIL 1.T320.3 HKHA Specification Library 2004 Cl. PIL 1.T320.4
	Curing of test specimen in the laboratory		HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.1 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.1
Making of test cubes in the laboratory	In-house method K-T-111		
Trial mix of repair mortar/grout	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.20 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.20		

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Grout (cont'd)	Coutinho Ring shrinkage cracking test Modified Figg test-Air permeability test Determination of compressive strength of grout cubes	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.6 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.6 HKHA Specification Library (1998). CON 2.T120.2(b) HKHA Specification Library (2000). CON 2.T120.3(b) HKHA Specification Library (2004). CON 2.T120.4(a) HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.7 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.7 (ref: modified Figg test described in "Improvements to the Figg Method for determining the air permeability of concrete" HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.1 HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.2.6.1 HKHA/MTS Package A (06/08) Specification, Part D Cl. 2.1 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.1 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.2.6.1
	Grout (Site test)	Flow of grout for preplaced- aggregate concrete (Flow cone method) Bleeding and free expansion	ASTM C939-97 excluding mixing ASTM C939-02 excluding mixing GS for Civil Engineering Works (1992), Cl. 17.60 HKHA Specification Library 2000 Cl. PIL 1.T320.3 HKHA Specification Library 2004 Cl. PIL 1.T320.4

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Mortar	Determination of air content of freshly mixed mortars (Density method)	BS 4551 : 1980 Cl. 13.2 BS 4551 : Part 1 : 1998 Cl. 10.2
		Paint, varnish, and related Products	Fineness of grind
	Determination of flow time by use of flow cup		BS 3900 : A6 : 1996 BS EN ISO 2431 : 1996
	Consistency of determination using Stormer viscometer		ASTM D562 – 81 (Reapproved 1997)
	Examination and preparation of samples for testing		BS 3900 : A2 : 1993 ISO 1513 : 1992
	Determination of dry-film thickness by eddy current method		BS 3900 : Part C5 : 1997 (Method 7) ISO 2808 : 1997 (Method 7)
	Determination of wet-film thickness		BS 3900 : C5 : 1997 (Method 1) ISO 2808 : 1997 (Method 1)
	Scratch test		BS 3900 : E2 : 1992 ISO 1518 : 1992
	Bend test	BS 3900 : E1 : 1995 BS EN ISO 1519 : 1995	
	Polymer modified mortar and prebagged materials (Chemical analysis)	Sample treatment	HKHA Standard 002 : 1990 (Modified) Cl. 6
		Polymer solids content	HKHA Standard 002 : 1990 (Modified) Cl. 8
		Cement content and sand/cement ratio (by CaO determination)	HKHA Standard 002 : 1990 (Modified) Cl.7
	Polymer latex (Chemical analysis)	Carbon dioxide content (Gasometric)	HKHA Standard 002 : 1990 (Modified) Cl. 7.2
Polymer solids content		HKHA Standard 002 : 1990 (Modified) Cl. 2	

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Pulverized fuel ash	Moisture content	BS 3892 : Part 1 : 1982 (AMD 4629) Appendix B BS 3892 : Part 1 : 1997 Annex C, with modification
		Fineness	BS 3892 : Part 1 : 1982 (AMD 4629) Appendix D BS 3892 : Part 1 : 1997 Annex D, with modification
		Density	BSEN 196-6 : 1995 Annex NC
		Water requirement	BS 3892 : Part 1 : 1982 (AMD 4629) Appendix E BS 3892 : Part 1 : 1997 Annex E with modification
		Strength factor	BS 3892 : Part 1 : 1997 Annex F with modification
		Initial setting time	BSEN 196-3 : 1995 Cl. 6 with modification
		Soundness	BSEN 196-3 : 1995 Cl. 7 with modification
	Pulverized fuel ash (site tests)	Sampling of pulverized fuel ash	BS 3892 : Part 1 : 1982 BS EN 196 – 7 : 1992
	Pulverized fuel ash (Chemical analysis)	Calcium oxide content (CaO)	In-house Method C-T-171
		Loss-on-ignition (L.O.I.)	BS 4550 : Part 2: 1970 Cl. 13.2 BS EN 196 : Part 2 : 1995 Cl. 7 (using 1h ignition time)
		Magnesium oxide content (MgO)	BS 3892 : Part 1 : 1982 Appendix C
		Total alkali content (equivalent Na ₂ O)	In-house Method C-T-078
		Sulphuric anhydride content (SO ₃)	BS 4550 : Part 2: 1970 Cl. 10 BS EN 196 : Part 2 : 1995 Cl. 8
		Chloride content	BS EN 196 : Part 21 : 1992 Cl. 4

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Portland pulverised fuel ash cement (PPFAC) (Chemical analysis)	Proportion of PFA	In-house Method C-T-134
		Loss-on-ignition (L.O.I.)	BS 4550 : Part 2 : 1970 Cl. 13.2
		Sulphur trioxide content (as SO ₃)	BS EN 196 : Part 2 : 1995 Cl. 8
		Chloride content	BS EN 196 : Part 21 : 1992 Cl. 4
		Magnesium oxide content (MgO)	BS 3892 :Part 1 : 1982 Appendix C
		Loss-on-ignition (L.O.I.)	BS EN 196 : Part 2 : 1995 Cl. 7
	Repair mortar	Flow	BS 4551 : 1980 BS 4551 : 1998 : Part 1
		Consistence	BS 4551 : 1980 BS 4551 : 1998 : Part 1
		Trial mixes	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.20 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.20
		Making of test cubes	In-house Method K-T-111
		Curing of test specimens	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.1 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.1
		Determination of compressive strength of repair mortar cubes	Compressive strength – HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.1 Compressive strength – HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.1 Density – BS 6319 Part 5: 1984
		Compressive strength of test cubes in the force range 50 kN - 2000 kN	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.1 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.1
		Coutinho Ring test (Shrinkage cracking)	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.6 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.6

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Repair mortar (cont'd)	Long term shrinkage	HKHA/MTS Package D (06/08) Specification, Part D, Cl. 2.1.21 HKHA/MTS Package D (08/10) Specification, Part D, Cl. 2.1.21	
		Air permeability-modified Figg test	HKHA/MTS Package D (06/08) Specification, Part D, Cl. 2.1.7 HKHA/MTS Package D (08/10) Specification, Part D, Cl. 2.1.7 HKHA Specification Library (1998) CON2.T120.2(b) HKHA Specification Library (2000) CON2.T120.3(b) HKHA Specification Library (2004) CON2.T120.4(a)	
		Repair mortar (Site tests)	Flow	In-house Method P-T-008
			Obtaining inspection core samples	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.22 HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.22
			Determination of bond strength of mortar on concrete (pull-off test)	HKHA/MTS Package D (06/08) Specification, Part D Cl. 2.1.15 (Method 1) HKHA/MTS Package D (08/10) Specification, Part D Cl. 2.1.15 (Method 1)
		Road surface (site test)	Determination of the rate of application and distribution of surface applied glass beads	BS 3262 : Part 3 : 1989, Appendix A (amendment 8785)
	Determination of the surface regularity of carriageways (rolling straightedge method)		Highways Department (Research and Development Division) Guidance Notes on Road Testing - RD/GN/009 September 1989	
	Determination of the texture depth of carriageways		General specification for civil engineering works : Volume 2 : 1992, Appendix 10.1	
			Highways Department (Research and Development Division) Guidance Notes on Road testing - RD/GN/009 September 1989	
			HKHA specification library RAP 1.T710.3 – 1.T720.3 (bituminous carriageways)	
			HKHA specification library 2000 : RAP 2.T910.3 – 2.T1010.3 (concrete carriageways)	

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Road surface (site test) (cont'd)	Determination of thickness of road marking material	BS 3262 : Part 3 : 1989, Appendix B – micrometer method (Amendment 8785)
		Skid resistance – portable pendulum tester	Highways Department Guidance Notes on Road Testing RD/GN/009
	Rock	Determination of point load strength of rock	ASTM D5731 - 95 International Society for Rock Mechanics (1985) “Suggested method for determining point load strength”
		Determination of the laboratory direct shear strength of jointed rock	ASTM D5697 – 95 with modification
		Determination of unconfined compressive strength of intact rock core specimen	ASTM D2938 - 95
		Preparation of rock core specimens and determination of dimensional shape tolerance	ASTM D4543 – 85 (Re-approved 1991)
	Safety glass and safety plastic	Impact performance requirements for flat safety glass and safety plastics for use in buildings	BS 6206 : 1981 (AMD 4580, 5189, 7589, 8156 and 8693) excluding Cl. 6 and ANSI Z97.1 – 2004, Cl. 5.1
		Boil test for laminated glass	ANSI Z97.1 – 2004, Clause 5.2
		Determination of the thickness, width and length (sizes) and flatness of thermally toughened soda lime silicate safety glass	BS EN 12150-1 : 2000, Clause 6
		Determination of the thickness, width and length (sizes) and flatness of heat soaked thermally toughened soda lime silicate safety glass	BS EN 14179-1 : 2005, Clause 8
		Fragmentation test for thermally toughened soda lime silicate safety glass	BS EN 12150-1 : 2000, Clause 8
		Fragmentation test for heat soaked thermally toughened soda lime silicate safety glass	BS EN 14179-1 : 2005, Clause 10
		Determination of the localized warp and overall bow and warp of heat-treated flat glass	ASTM C1048 - 97b, Clause 11.6
	Bending strength of glass	BS EN 1288-3 : 2000	
	Screed	Determination of soundness of bonded and unbonded screed	BS 8204 : Part 1: 1987, Appendix B

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Soil	<p>Analysis of soil resistivity sample (Wenner Probe method)</p> <p>Analysis of soil Redox potential for undisturbed sample</p> <p>General procedure for sample preparation for phase 1 tests</p> <p>Determination of moisture content by oven-drying at 45°C±5°C</p> <p>Determination of moisture content by oven-drying at 105°C±5°C</p> <p>Comparative test for the determination of moisture content by oven-drying</p> <p>Determination of liquid limit by the cone penetrometer</p> <p>Determination of the plastic limit, plasticity index and liquidity index</p> <p>Determination of liquid limit, plastic limit, and plasticity index</p> <p>Determination of liquidity index</p> <p>Determination of particle density by gas jar Method</p> <p>Determination of particle density by small pycnometer method</p> <p>Determination of particle size distribution by wet sieving (with dispersant)</p> <p>Determination of particle size distribution by wet sieving (without dispersant)</p> <p>Determination of particle size distribution by the hydrometer method (with dispersant)</p> <p>Determination of particle size distribution by the hydrometer method (without dispersant)</p>	<p>BS 1377 : Part 3 : 1990, Cl. 10.3 (Amendment 9028 : 1996)</p> <p>BS 1377 : Part 3 : 1990, Cl. 11 (Amendment 9028 : 1996)</p> <p>GEOSPEC 3 : 2001 Test 4</p> <p>GEO Report No. 36 : 1994 Test 2.3.2B GEOSPEC 3 : 2001 Test 5.1</p> <p>GEO Report No. 36 : 1994 Test 2.3.2A GEOSPEC 3 : 2001 Test 5.2</p> <p>GEO Report No. 36 : 1994 Test 2.3.2C GEOSPEC 3 : 2001 Test 5.3</p> <p>GEO Report No. 36 : 1994 Test 2.4.3</p> <p>GEO Report No. 36 : 1994 Test 2.5.3</p> <p>GEOSPEC 3 : 2001 Test 6.1</p> <p>GEOSPEC 3 : 2001 Test 6.2</p> <p>GEOSPEC 3 : 2001 Test 7.1</p> <p>GEOSPEC 3 : 2001 Test 7.2</p> <p>GEO Report No. 36 : 1994 Test 2.9.2A GEOSPEC 3 : 2001 Test 8.1</p> <p>GEO Report No. 36 : 1994 Test 2.9.2B GEOSPEC 3 : 2001 Test 8.2</p> <p>GEO Report No. 36 : 1994 Test 2.9.5A GEOSPEC 3 : 2001 Test 8.5</p> <p>GEO Report No. 36 : 1994 Test 2.9.5B GEOSPEC 3 : 2001 Test 8.6</p>

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Soil (cont'd)	<p>Construction of a continuous particle size Distribution curve from the results of wet sieving and sedimentation test</p> <p>Determination of dry density / moisture content relationship of non-crushable soils (using a 1000cc mould)</p> <p>Determination of dry density / moisture content relationship of crushable soils (using a 1000cc mould)</p> <p>Determination of dry density / moisture content relationship of non-crushable soils (using a CBR mould)</p> <p>Determination of dry density / moisture content relationship of crushable soils (using a CBR mould)</p> <p>Determination of the dry density/moisture content relationship of soils containing particles which are not susceptible to crushing (using a 1000cc mould and 4.5 kg rammer)</p> <p>Determination of the dry density/moisture content relationship of soils containing particles which are susceptible to crushing (using a 1000cc mould and 4.5 kg rammer)</p> <p>Determination of the dry density/moisture content relationship of soils containing particles which are not susceptible to crushing (using a CBR mould and 4.5 kg rammer)</p> <p>Determination of the dry density/moisture content relationship of soils containing particles which are susceptible to crushing (using a CBR mould and 4.5 kg rammer)</p> <p>Determination of the in situ bulk density and in situ dry density of soil by the sand replacement method suitable for fine- and medium-grained soils (with small pouring cylinder)</p> <p>Determination of the in-situ California bearing ratio (CBR)</p>	<p>GEO Report No. 36 : 1994 Test 2.9.6 GEOSPEC 3 : 2001 Test 8.7</p> <p>GEO Report No. 36 : 1994 Test 4.3.3A GEOSPEC 3 : 2001 Test 10.1</p> <p>GEO Report No. 36 : 1994 Test 4.3.3B GEOSPEC 3 : 2001 Test 10.2</p> <p>GEO Report No. 36 : 1994 Test 4.3.4A GEOSPEC 3 : 2001 Test 10.3</p> <p>GEO Report No. 36 : 1994 Test 4.3.4B GEOSPEC 3 : 2001 Test 10.4</p> <p>GEOSPEC 3 : 2001 Test 10.5</p> <p>GEOSPEC 3 : 2001 Test 10.6</p> <p>GEOSPEC 3 : 2001 Test 10.7</p> <p>GEOSPEC 3 : 2001 Test 10.8</p> <p>GEO Report No. 36 : 1994 Test 9.2.1 GEOSPEC 3 : 2001 Test 11.1</p> <p>BS 1377 : Part 9 : 1990 Cl. 4.3</p>

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Soil (cont'd)	<p>Determination of the in situ bulk density and in situ dry density of soil by the sand replacement method suitable for fine-, medium-, and coarse-grained soils (with large pouring cylinder)</p> <p>Determination of in-situ bulk density and in-situ dry density of soils by nuclear densometer method suitable for fine- and medium-grained soils</p> <p>Determination of relative compaction of fill materials</p> <p>Determination of the California bearing ratio (CBR)</p> <p>Preparation of remoulded test specimens from disturbed soil samples</p> <p>Preparation of test specimens from undisturbed soil samples</p> <p>The one-dimensional consolidation test</p> <p>The isotropic compression test in a triaxial Cell</p> <p>The unconsolidated undrained triaxial compression test without pore pressure measurement</p> <p>The isotropically consolidated undrained triaxial compression test with pore pressure measurement</p> <p>The isotropically consolidated drained triaxial compression test with measurement of Volume change</p> <p>The direct shear test (small shear box apparatus)</p> <p>GCO Probe test</p>	<p>GEO Report No. 36 : 1994 Test 9.2.2 GEOSPEC 3 : 2001 Test 11.2</p> <p>GEOSPEC 3 : 2001 Test 11.3 General specification for civil engineering works Volume 1 : 1992 : Appendix 6.3</p> <p>GEOSPEC 3 : 2001 Test 11.4 Buildings Department PNAP 55 : 1994 Clause 2, Appendix A</p> <p>GEOSPEC 3 : 2001 Test 12.1</p> <p>GEOSPEC 3 : 2001 Test 13.2</p> <p>GEOSPEC 3 : 2001 Test 13.3</p> <p>GEOSPEC 3 : 2001 Test 14.1</p> <p>GEOSPEC 3 : 2001 Test 14.2</p> <p>GEOSPEC 3 : 2001 Test 15.1</p> <p>GEOSPEC 3 : 2001 Test 15.2</p> <p>GEOSPEC 3 : 2001 Test 15.3</p> <p>GEOSPEC 3 : 2001 Test 16.1</p> <p>General Specification for Civil Engineering Works, Volume 1, Appendix 7.1, 1992</p>

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Soil (Chemical analysis)	Total sulphate content	GEOSPEC 3 : 2001 Test 9.3
		Water-soluble sulphate content	GEOSPEC 3 : 2001 Test 9.3
		Organic matter content	GEOSPEC 3 : 2001 Test 9.1
		Loss-on-ignition	GEOSPEC 3 : 2001 Test 9.2
		Water-soluble chloride content	GEOSPEC 3 : 2001 Test 9.4
		pH value	GEOSPEC 3 : 2001 Test 9.5
	Steel (Chemical analysis)	Carbon content	In-house Method C-T-061
		Nickel content	ASTM E350-95 Cl. 180-187 ASTM E353-93 Cl. 172-179
		Phosphorus content	ASTM E350-95 Cl. 18-29 ASTM E353-93 Cl. 18-29
		Silicon content	ASTM E350-95 Cl. 46-52 ASTM E353-93 Cl. 46-52
		Sulfur content	In-house Method C-T-062
		Aluminium, Chromium, Copper, Lead, Manganese, Molybdenum, Nickel, Tin, Vanadium	In-house Method C-T-067 (by AAS)
	Steel	Proof load test of steel nuts	BS 3692 : 2001
Tensile strength test on unmachined specimens of bolt and screw in the force range 10 kN – 1500 kN		BS 3692 : 2001	
Bending, shear, tensile and impact tests of mechanical seals		ISO/PAS 17712 : 2006	

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Steel (reinforcing)	Tensile strength test on machined specimens of bolt and screw in the force range 10 kN – 1500 kN Tensile strength test on hot rolled bars in the force range 10 kN - 1500 kN Bend test on hot rolled bars Rebend test on hot rolled bars Tensile strength tests on cold reduced wire in the force range 10 kN - 1500 kN Rebend tests on cold reduced wire Tensile strength tests on steel fabric in the force range 10 kN - 1500 kN Bend tests on steel fabric Weld tests on steel fabric Tensile test of reinforcing bar with mechanical coupler (8 mm – 50 mm diameter) in the force range 10 kN – 1500 kN	BS 3692 : 1967 (Specification for ISO metric precision hexagon bolts, screws and nuts) BS 3692 : 2001 (Specification for ISO metric precision hexagon bolts, screws and nuts) BS 4449 : 1988 (up to 40mm dia.) Building Ordinance Office PNAP : 122 (Jan 90) BS 4449 : 1988 Building Ordinance Office PNAP : 122 (Jan 90) BS 4449 : 1988 Building Ordinance Office PNAP : 122 (Jan 90) BS 4482 : 1985 BS 4482 : 1985 BS 4483 : 1985 BS 4483 : 1985 BS 4483 : 1985 BS 8110 Part 1 : 1985 : Clause 3.12.8.16.2 BS 8110 Part 1 : 1997 : Clause 3.12.8.16.2 General specification for Civil Engineering Works Volume 2 : 1992 Edition : Clause 15.33 KCRC West Rail Standard, Volume 2, Structural : January 1999 edition : Clause 23.10.05

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Steel (reinforcing)	Tensile strength test on carbon steel bars in the force range 10 kN - 1500 kN Bend tests on carbon steel bars Rebend tests on carbon steel bars Performance test of tension bonded epoxy coated carbon steel bar	CS2 : 1995 (up to 40 mm dia.) CS2 : 1995 Section 5-Purchaser's tests (for 50mm dia.) CS2 : 1995 CS2 : 1995 HKHA Specification Library (2004) CON3.T450.4 and CON3.T460.4 BS7295 : Part 1 : 1990 Cl. 4 (AMD 6955) with modification BS 3900 : Part C5 : 1997 (Method 6)
	Steel (structural)	Tensile strength tests on weldable structural steel sections in the force range 10 kN - 1500 kN Charpy 'V' notch impact test Transverse tensile test of fusion welded butt joint Tensile test of metallic materials	BS 4360 : 1986 BS 4360 : 1990 BS EN 10045-1 : 1990 BS EN 895 : 1995 (Destructive test on welds in metallic materials) BS EN 10002-1 : 2001 BS EN 10137-1 : 1996 Cl.8.5.2.2 BS EN 10137-2 : 1996 Cl. 7.4.1 BS EN 10137-3 : 1996 Cl. 7.4.1 BS EN 10025 : 1990 Cl. 7.4.1 & 8.6 BS EN 10155 : 1993 Cl. 7.4.2 & 8.6.3.2 BS EN 10113-1 Cl. 8.6.2.1 BS EN 10113-2 Cl. 7.4.1 BS EN 10113-3 Cl. 7.4.1 BS EN 10210-1 : 1994 Cl.9.2.1

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Tiles	Surface quality Surface flatness Rectangularity Length and width Straightness of sides Thickness Water absorption Modulus of rupture Mohs hardness Resistance to thermal shock Resistance to surface abrasion of glazed tiles In-situ pull-off test of ceramic tiles In-situ pull-off test on mosaic tiles Pull-off test of tiles In-situ pull-off test on completed tiles Determination of length and width of ceramic tiles Determination of thickness of ceramic tiles Determination of straightness of sides of ceramic tiles Determination of rectangularity of ceramic tiles Determination of surface flatness of ceramic Tiles Determination of surface quality of ceramic tiles	BS 6431 : Part 10 : 1984 (AMD 7099) BS 6431 : Part 10 : 1984 (AMD 7099) BS 6431 : Part 10 : 1984 (AMD 7099) BS 6431 : Part 10 : 1984 (AMD 7099) BS 6431 : Part 10 : 1984 (AMD 7099) BS 6431 : Part 10 : 1984 (AMD 7099) BS 6431 : Part 11 : 1983 (AMD 7100) BS 6431 : Part 12 : 1983 (AMD 7101) BS 6431 : Part 13 : 1986 (AMD 7102) BS 6431 : Part 16 : 1983 (AMD 7105) BS 6431 : Part 20 : 1984 (AMD 7109) In-house method T-T-053 In-house method T-T-054 In-house method T-T-102 HKHA Specification Library 2004Edition FIN 5.T150.4(3) with modification on loading rate BS EN ISO 10545-2 : 1997, Clause 2 BS EN ISO 10545-2 : 1997, Clause 3 BS EN ISO 10545-2 : 1997, Clause 4 BS EN ISO 10545-2 : 1997, Clause 5 BS EN ISO 10545-2 : 1997, Clause 6 BS EN ISO 10545-2 : 1997, Clause 7

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Tiles (cont'd)	<p>Determination of water absorption apparent porosity, apparent relative density and bulk density of ceramic tiles</p> <p>Determination of resistance to surface abrasion of glazed tiles</p> <p>Determination of crazing resistance of glazed tiles</p> <p>Determination of crazing resistance of glazed tiles</p> <p>Determination of modulus of rupture and breaking strength of ceramic tiles</p> <p>Determination of resistance to thermal shock of ceramic tiles</p> <p>Determination of linear thermal expansion of ceramic tiles</p> <p>Determination of linear thermal expansion of ceramic tiles</p> <p>Determination of resistance to deep abrasion of unglazed tiles</p> <p>Determination of resistance to deep abrasion of unglazed tiles</p> <p>Determination of resistance to stains of ceramic tiles</p> <p>Resistance of glazed tiles to chemical attack</p> <p>Resistance of unglazed tiles to chemical attack</p> <p>Determination of chemical resistance of ceramic tiles</p>	<p>BS EN ISO 10545-3 : 1997</p> <p>BS EN ISO 10545-7 : 1999 (without the portion to test for mass loss, colour change or gloss change)</p> <p>BS 6431 : Part 17 : 1983 (AMD 7106) EN 105 : 1991</p> <p>BS EN ISO 10545-11 : 1996</p> <p>BS EN ISO 10545-4 : 1997</p> <p>BS EN ISO 10545-9 : 1996</p> <p>BS 6431 : Part 15 : 1983 (AMD 7104) EN 103 : 1991</p> <p>BS EN ISO 10545-8 : 1996</p> <p>BS 6431 : Part 14 : 1983 (AMD 7103) EN 102 : 1991</p> <p>BS EN ISO 10545-6 : 1997</p> <p>BS EN ISO 10545-14 : 1997</p> <p>BS 6431 : Part 19 : 1984 (AMD 7108)</p> <p>BS 6431 : Part 18 : 1983 (AMD 7107)</p> <p>BS EN ISO 10545-13 : 1997</p>

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Tile adhesives	Initial tensile adhesion strength for normal setting adhesives	BS EN 1348 : 2007 Part 8.2
		Tensile adhesion strength after water immersion for normal setting adhesives	BS EN 1348 : 2007 Part 8.3
		Tensile adhesion strength after heat ageing for normal setting adhesives	BS EN 1348 : 2007 Part 8.4
		Tensile adhesion strength after freeze/thaw cycles for normal setting adhesives	BS EN 1348 : 2007 Part 8.5
		Initial tensile adhesion strength for fast setting adhesives	BS EN 1348 : 2007 Part 8.2
		Open time: tensile adhesion strength	BS EN 1348 : 2007 Part 8
		Slip resistance of adhesives for tiles	BS EN 1308 : 2007
	Tile grout	Water absorption of tile grout	HKHA test method : T-grout.xls date : 10/04/2000 HKHA Specification Library (SL) 2004 Edition. FIN5.M1010.4(2)(c) ANSI A 118.6 – 1992 Clause H3.4
		Tile group tensile adhesion compatibility with tile adhesive	HKHA test method : T-grout.xls date : 10/04/2000 HKHA Specification Library (SL) 2004 Edition. FIN5.M1010.4(2)(c) BS 5980 : 1980 (AMD 5861) Appendix D (with modification)
		Linear shrinkage	HKHA test method : T-grout.xls date : 10/04/2000 HKHA Specification Library (SL) 2004 Edition. FIN5.M1010.4(2)(c) ANSI A 118.6 – 1992 Clause H3.4

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Water	Test for water for making concrete (Initial setting time, compressive strength)	BS 3148 : 1980	
	Water (Chemical analysis)	Bicarbonate and carbonate contents		In-house Method C-T-194
		Chloride content		In-house method C-T-193
		Total dissolved solids dried at 180°C		In-house method C-T-195
		Acid-soluble alkali content (equivalent Na ₂ O)		In-house Method C-T-182
	Ground water (Chemical analysis)	Sulphate content		GEOSPEC 3 : 2001 Test 9.3
		pH value		GEOSPEC 3 : 2001 Test 9.5
	Welds (Destructive tests)	Bend test of fusion welded butt joint		BS EN 910 : 1996 BS 709 : 1983, Cl. 6 (AMD 8909, 9146, 9378)
		Charpy V-notch impact test of fusion welded butt joint		BS EN 875 : 1995 BS 709 : 1983, Cl. 11 (AMD 8909, 9146, 9378)
		All weld/longitudinal tensile test weld metal In fusion welded joints		BS 709 : 1983 BS EN876 : 1995
		Fillet weld fracture test		BS 709 : 1983 (AMD 1, 2 & 3)
		Fracture test on welds in metallic materials		BS EN 1320 : 1997
		Macro-examination of fusion welded joints and weld metal		BS 709 : 1983 BS EN 1321 : 1997
Nick-break test on welds in metallic materials			BS 709 : 1983	
Vickers hardness testing of metallic materials and welds		BS 427 : 1990 BS EN 1043-1 ; 1996 BS EN ISO 6507-1 : 2005		

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CONSTRUCTION MATERIALS (cont'd) 建築材料(續上)	Welds (Non-destructive tests)	Magnetic particle flaw detection Magnetic particle examination of welds (magnetic flow method and colour contrast techniques) Ultrasonic examination of welds (Manual examination) Penetrant flaw detection Penetrant testing (colour contrast and solvent removal method) Radiographic examination of fusion welded butt joints in steel Radiographic examination of fusion welded circumferential butt joints in steel pipes Radiographic examination of fusion welded butt joints in steel plate and pipe Visual inspection of fusion welded joints Non-destructive examination of fusion welds (Visual examination)	BS 6072 : 1981 (1986) (Magnetic flow method colour contrast technique using permanent magnets and A.C. yokes). BS EN 1290 : 1998 BS 3923 : Part 1: 1986 (Butt joints in plates and pipes, 'T' joint welds, Nozzle welds and Node welds) BS EN 1714 : 1998 (AMD 14941) (Examination level A, B and C) BS 6443 : 1984 (Colour contrast method) BS EN 571-1 : 1997 BS 2600 : Part 1 : 1983 (X-Ray and Gamma Ray) BS 2910 : 1986 (X-Ray and Gamma Ray) BS EN 1435 : 1997 (AMD 14938) BS 5289 : 1976 In-house method N-T-004 BS EN 970 : 1997

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ENVIRONMENTAL TESTING 環境測試	Indoor Air Quality Testing	Extractable components collected in passive samplers:- - Formaldehyde - Nitrogen dioxide Microbiological tests:-	In-house method E-T-086 (HPLC/UVD) In-house method E-T-085 (FIA)
	Collectate sampled by Biotest Hycon RCS Plus air sampler	Airborne bacteria count (number of colonies on agar strip) (30 °C for 2 days)	In-house method B-T-008
	Collectate sampled by two-stage Andersen sampler	Airborne bacteria count (number of colonies and corrected number of colonies on agar plate) (30 °C for 2 days)	In-house method B-T-009
	Asbestos in bulk	Sampling a) Cementitious b) Wet applied c) Dry applied d) Bonded	In-house Method G-T-022 In-house Method G-T-020 In-house Method G-T-021 In-house Method G-T-022
	Asbestos bulk samples	Identification Asbestos-containing material	In-house Method G-T-023 Air Pollution Control Ordinance, Section 2 (Gazette No. 23 / 1997)
	Asbestos air-borne fibres and dust	Air sampling a) Background, Environmental & Reassurance Test b) Leakage Test c) Personal & Work Area Static Test d) Clearance Test	In-house Method G-T-015 In-house Method G-T-016 In-house Method G-T-017 In-house Method G-T-018
	Asbestos air-borne samples	Fibre counting	MDHS 39 / 3

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ENVIRONMENTAL TESTING 環境測試	Water and Wastewater	Physical Examination :- - pH Value - Turbidity - Conductivity - Salinity - Dissolved oxygen - Colour - Total Suspended Solids Dried at 103 -105°C - Total Solids Dried at 103 -105°C - Total Dissolved Solids dried at 180°C - Volatile Solids Ignited at 550°C (Organic matter) - Fixed Solids Ignited at 550°C	 APHA 17e 4500-H ⁺ B APHA 18e 2130 B ASTM D1125-82 Method B <i>Excluding</i> Cl. 7 In-house Method E-T-006 APHA 17e 4500-0 G In-house Method E-T-008 APHA 17e 2540 D APHA 17e 2540 B APHA 17e 2540 C APHA 17e 2540 B & E APHA 17e 2540 E

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ENVIRONMENTAL TESTING (cont'd) 環境測試 (續上)	Water and Wastewater (cont'd)	Non-metallic Constituents :- (cont'd) - Nitrogen (Total oxidised) - Nitrogen (Total Kjeldahl) - Nitrogen (Total Kjeldahl) - Nitrogen (Ammonia) - Nitrogen (Ammonia) - Reactive Phosphorus - Total Phosphorus Digestion Determination - Residual Free Chlorine - Total Residual Chlorine Organic Pollutants :- - Oil and grease - Biochemical Oxygen Demand - Chemical Oxygen Demand - Anionic Surfactants Microbiological tests :- - E. coli count	APHA 18e 4500-NO ₃ E (reduction) & F (determination) APHA 20e 4500-NO ₃ E & F APHA 18e 4500-Norg B & 4500-NH ₃ E (Titrimetric method) In-house Method E-T-037 (Colorimetric method) APHA 18e 4500-NH ₃ B & E (Titrimetric method) In-house Method E-T-039 (Colorimetric method) In-house Method E-T-055 APHA 17e 4500-PB5 In-house Method E-T-056 In-house Method E-T- 066 APHA 18e 4500-Cl B In-house Method E-T- 067 APHA 18e 5520B BS 6068 : Section 2.14 : 1990 APHA 18e 5220 B In-house Method E-T-057 DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Membrane Filtration Procedure: Section 7.8, 7.9.4.2 Bacterial Confirmation: Section 7.9.4.4 & in-situ urease test

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ENVIRONMENTAL TESTING (cont'd) 環境測試 (續上)	Water and Wastewater (cont'd)	Microbiological tests :- (cont'd) -Total Coliform count -Faecal Coliform count - Heterotrophic Plate Count -Legionellae including <i>Legionella pneumophila</i>	DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Membrane Filtration Procedure: Sections 7.8, 7.9.4.1 Bacterial Confirmation: Section 7.9.4.3 DoE (1983) The Bacteriological Examination of Drinking Water Supplies, 1982 Membrane Filtration Procedure: Sections 7.8, 7.9.4.2 Bacterial Confirmation: Section 7.7.6.3 APHA 20e 9215 A & B AS/NZS 3896:1998
	Saline Water	Physical Examination :- - Suspended solids content	In-house Method E-T-053 (Gravimetric)
	Sediment	Organic Pollutants :- - Polycyclic Aromatic Hydrocarbons :- Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(g,h,i) perylene Benzo(a)pyrene, Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Napthalene Indeno(1,2,3-c,d)pyrene Phenathrene Pyrene	In-house Method E-T-071 (Extraction & clean up) In-house Method E-T-072 (GC/MS)

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ENVIRONMENTAL TESTING (cont'd) 環境測試 (續上)	HEPA Appliances (air movers and vacuum cleaners) Class II (laminar flow) Biosafety cabinetry	Visual inspection Housing-leak test (for HEPA air mover) Airflow capacity (for HEPA air mover) In-place leak test Mandatory field tests - Downflow velocity profile test - Inflow velocity test - Airflow smoke patterns test - HEPA filter leak test - Cabinet integrity test (pressure decay / soap bubble test) for A1 cabinet - Site installation assessment tests - Alarm functions - Blower interlocks - Exhaust system performance Optional worker comfort and safety tests: - Lighting intensity test - Vibration test - Noise level test	In-house Method U-T-001 In-house Method U-T-002 In-house Method U-T-003 In-house Method U-T-004 NSF/ANSI 49-2004a Annex F

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MaterialLab Division			
Building Component Testing Facility – Kam Tin			
TEST CATEGORY 測試類別	ITEMS, MATERIALS OR PRODUCTS TESTED 測試項目、材料或產品	SPECIFIC TESTS OR PROPERTIES 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
CONSTRUCTION MATERIALS 建築材料(續上)	Concrete pipe	Crushing strength tests of concrete pipe	BS 5911 : Part 100 : 1988 (AMD 6269 and 7588)
		Hydrostatic test for concrete pipe	BS 5911 : Part 100 : 1988 (AMD 6269 and 7588)
		Water absorption test for concrete pipe	BS 5911 : Part 100 : 1988(AMD 6269 and 7588)
	Door	Resistance to closing against an obstruction	HKHA Specification Library (SL) 2000 Edition : COM 8.T1210.3 to COM 8.T1220.3, Test 11 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(p). Test 11
		Resistance to jarring and vibration	HKHA Specification Library (SL) 2000 Edition : COM 8.T1010.3.3 to COM 8.T1030.3, Test 9 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(n). Test 9
		Strength in the plane of door leaf	HKHA Specification Library (SL) 2000 Edition : COM 8.T710.3 to COM 8.T750.3, Test 6 HKHA Specification Library (SL) 2004 Edition. COM5M040.4(2)(k). Test 6

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Geotechnical Division			
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CONSTRUCTION MATERIALS 建築材料	Foundation Piles	<p>Borehole inspection</p> <p>Dynamic Pile Test (PDA)</p> <p>Pile integrity tests</p> <p style="padding-left: 20px;">- Pulse Echo Method</p> <p style="padding-left: 20px;">- Transient Response Method</p> <p>Integrity testing of concrete deep foundations by ultrasonic crosshole testing</p> <p>Static loading tests on piles</p>	<p>In-house method M-Q-017</p> <p>ASTM D4945 - 00</p> <p>ASTM D5882 - 00</p> <p>ASTM D 6760-02</p> <p>Architectural Services Department General Specification Section 5.28, 1993</p> <p>General Specification for Civil Engineering Works Appendix 8.1, 1992 Edition</p> <p>Hong Kong Housing Authority Specification Library 2000 Edition</p> <p>Loading test generally : Clauses PIL 1.T660.3 to PIL 1.T.690.3</p> <p>Procedure for load tests : Clauses PIL 1.T810.3 to PIL 1.T870.3</p> <p>Load test results : Clauses PIL 1.T1010.3 to PIL 1.T1020.3</p> <p>Hong Kong Housing Authority Contract BOOKLET - Materials Testing Services Term Contract (1999/2001) for non-destructive testing for piles Static pile loading test : Clauses D7 and D9 (c) (viii)</p> <p>Hong Kong Housing Authority Specification Library 2000 Edition incorporating new / revised specification clauses promulgated in DCMBI No. P02/01</p> <p>Loading test general : Clauses PIL 1.T610A.A to PIL 1.T610B.A</p>

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CONSTRUCTION MATERIALS 建築材料	Foundation Piles (cont'd)	Static loading tests on piles (cont'd)	<p>Loading test of preliminary piles : Clauses PIL 1.T630.3to PIL 1.T690.3</p> <p>Procedure for load tests of preliminary piles : Clauses PIL 1.T810. to PIL 1.T900.3</p> <p>Load test results of preliminary piles : Clauses PIL 1.T1010.A to PIL 1.T1020.A</p> <p>Loading tests of working piles : Clauses PIL 1.T1022.N to PIL 1.T1027.A</p> <p>Load tests results of working piles : Clauses PIL 1.T1028.N to PIL T1040.3</p> <p>Hong Kong Housing Authority Contract Booklet - Materials Testing Services Term Contract (1999/2001) For non-destructive testing for piles with revised specification clauses for loading test.</p> <p>KCRC Major Capital Works Standard Specification Rev 0, March 2000 - Clause 32.14, Appendix A32.1 and Appendix 32.3 of Section 32. Installation and Testing of Driven Pile Foundations. - Clause 33.18, Appendix A33.1 and Appendix 33.6 of Section 33. Installation and Testing of Drilled Pile Foundations.</p> <p>KCRC West Rail Standard Specification - Clause 32.14, Appendix A32.1 and Appendix 32.3 of Section 32. Installation and Testing of Driven Pile Foundations. - Clause 33.18, Appendix A33.1 and Appendix 33.6 of Section 33. Installation and Testing of Drilled Pile Foundations.</p> <p>MTRC Materials and Workmanship specification For Civil Engineering Works, March 1998 - Load Tests on Piles, Clauses 19.100 to 19.102 and Appendix 19.1 – 19.2.</p> <p>Building Department PNAP 66, January 2002 Proof Tests : - Clauses 19 and 20 Proof Tests by imposition of test loads : - Clause 1 of Appendix D</p>

