



HKAS Accreditation in Digitalisation of Test Reports and Automation of Construction Materials Testing

香港認可處就數碼測試報告及建材測試自動化的認可



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Innovation and Technology Commission
The Government of the HKSAR
29 Feb 2024 (pm)





Construction 2.0

Time to change

「建造業2.0」

廣泛應用數碼化和
自動化等科技
應對挑戰，
令建築工程能夠

「提速、提效、提量、提質」





Hong Kong Accreditation Service (HKAS)

香港認可處

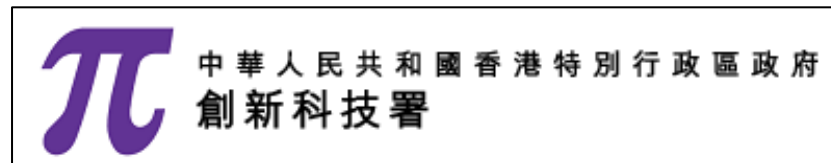


Electronic Test Reports 電子測試報告



Hong Kong Accreditation Service 香港認可處

- Part of Innovation and Technology Commission of the Hong Kong Special Administration Region (HKSAR) Government
創新科技署轄下



- Set up in 1998 (previously known as HOKLAS since 1985)
於1998年成立(前身是香港實驗所認可計劃HOKLAS執行機關，於1985年成立)
- The official accreditation body in Hong Kong
是香港唯一官方認可機構
- Provides independent and impartial accreditation services
提供獨立和公正的認可服務



Accreditation Schemes 認可計劃

- laboratories, certification bodies, inspection bodies, proficiency testing providers and reference material producers are accredited under three schemes

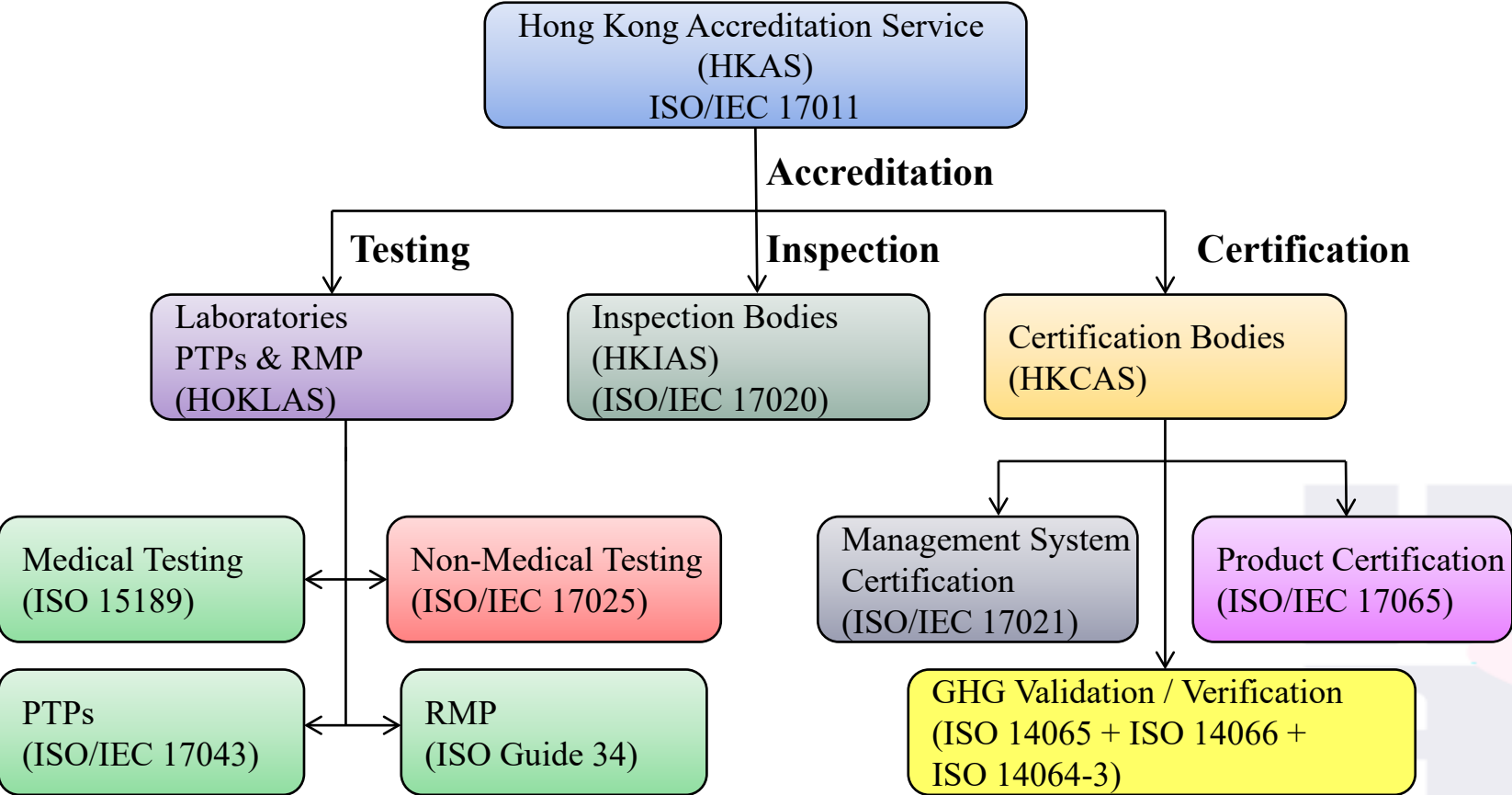


- HOKLAS (Hong Kong Laboratory Accreditation Scheme)
香港實驗室認可計劃
- HKCAS (Hong Kong Certification Body Accreditation Scheme)
香港認證機構認可計劃
- HKIAS (Hong Kong Inspection Body Accreditation Scheme)
香港檢驗機構認可計劃

- Voluntary participation in accreditation schemes 自願參與認可計劃



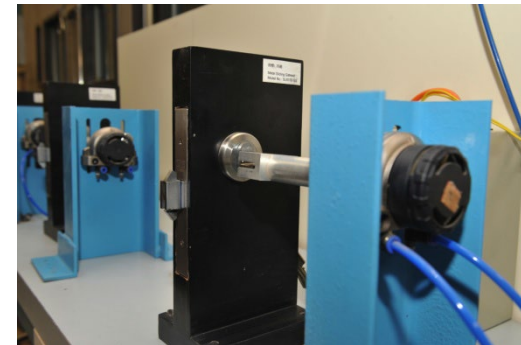
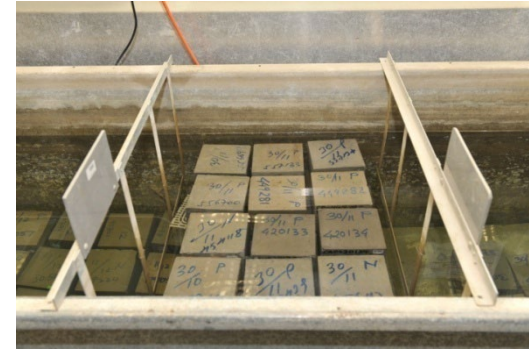
Schematic Diagram of Accreditation





Hong Kong Laboratory Accreditation Scheme (HOKLAS) – Scope of services 測試類別

- Calibration Services
- Chemical Testing
- Chinese medicine
- Construction Materials
- Electrical and Electronic Products
- Environmental Testing
- Food
- Forensic Testing
- Medical Testing
- Miscellaneous
- Pharmaceutical Products
- Physical and Mechanical Testing
- Textiles and Garments
- Toys and Children's Products



Number of Establishments Accredited by HKAS*

	No. of Establishments	No. of Establishments under Construction
Laboratories Under HOKLAS	231	77
Inspection bodies under HKIAS	24	15
Certification bodies under HKCAS	27	7
Total	282	99 (more than 1/3)

* as at 19 Feb 2024



Measures for monitoring performance of conformity assessment bodies 監控合格評定機構表現的措施

Accreditation is maintained through rigorous assessment and monitoring, the measures include:

透過嚴格的評審和監控來維持的認可資格，措施包括：

- Reassessments (複審)
- Surveillance (監察)
- Monitoring of changes (監控變化)
- Complaints handling (處理投訴)
- Proficiency Testing (能力驗證) / Inter-laboratory Comparison Study
- Code of conduct (紀律守則)



主辦機構 Organisers



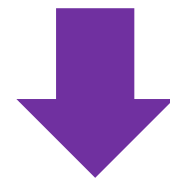
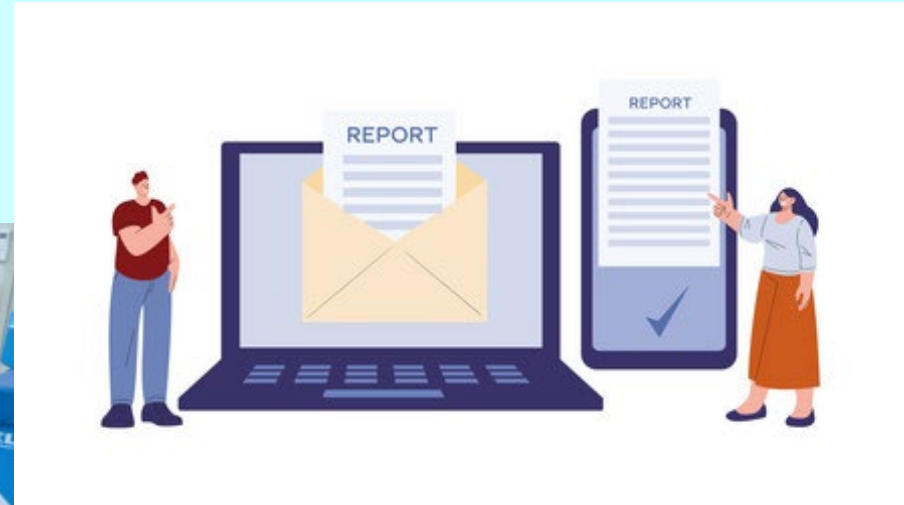
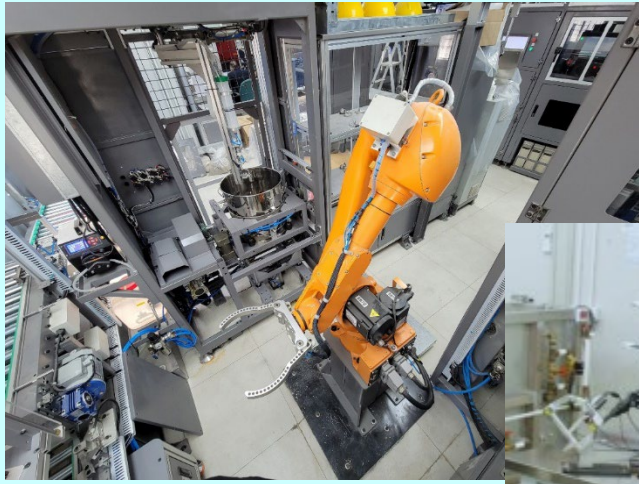
資助機構 Funding Organisation



SEMINAR ON CONSTRUCTION TESTING: TOWARDS DIGITALISATION AND AUTOMATION IN CONSTRUCTION TESTING

建築測試研討會： 建築測試邁向數碼化及自動化





On-site assessment
實地評審



HKAS On-site Assessment for 'Electronic Test Reports'

香港認可處就試驗所推出的「電子測試報告」所進行的實地評審

- Whether the signing of electronic reports complies with the relevant provisions of the Electronic Transactions Ordinance (Chapter 553)
電子報告的簽署是否符合《電子交易條例》(第553章)的相關規定；
- Hong Kong Housing Authority's (HKHA) requirements on electronic test reports with digital signatory
香港房屋委員會對數碼簽署人的電子測試報告的要求

(bb) If digital signature is implemented, digital signature suites with 2048-bit RSA key and SHA-256 shall be used. The digital certificate shall be issued by the Postmaster General or other certification authorities recognized by the Government Chief Information Officer under the Electronic Transactions Ordinance (Cap. 553).

The above requirement has been included in the latest term contracts of HKHA, which was commenced on 17.10.2022.

Hong Kong Housing Authority's requirements on electronic test reports with digital signatory

- The following requirement item C33.3 (bb) has been included in the latest term contracts, which was commenced on 17.10.2022.

PART C - TECHNICAL (GENERAL) (Cont'd)

C33 Security Requirements on IT/Data Communication Systems (Cont'd)

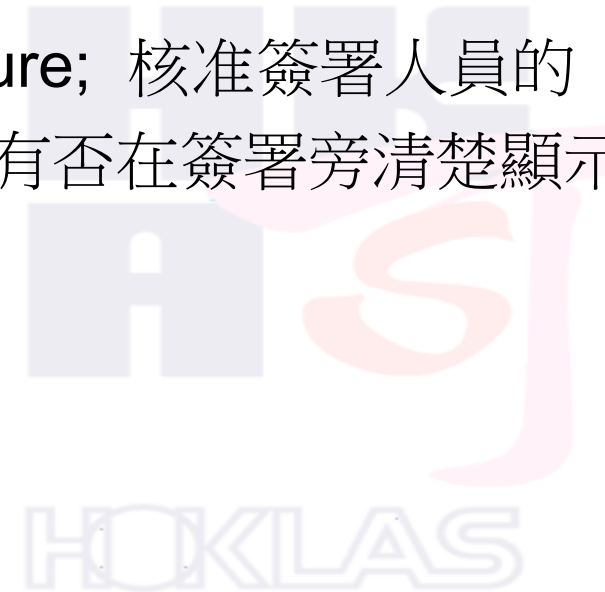
C33.3 Application Security Requirements (Cont'd)

- (viii) If XML is used, it shall not include sensitive data in XML document in clear-text. Extensible Stylesheet Language ("XSL") can be used to transfer the XML document to exclude/encrypt sensitive information prior to delivery.
- (z) The system shall avoid on disclosing system information through the error handling process.
- (aa) The system shall have the central module developed to record all audit trails, exceptions and generate error logs.
- (bb) If digital signature is implemented, digital signature suites with 2048-bit RSA key and SHA-256 shall be used. The digital certificate shall be issued by the Postmaster General or other certification authorities recognized by the Government Chief Information Officer under the Electronic Transactions Ordinance (Cap. 553).



HKAS On-site Assessment for 'Electronic Test Reports' 香港認可處就試驗所推出的「電子測試報告」所進行的實地評審

- Can the laboratory effectively ensure that the authorized signatory has made the authorisation and the traceability of the relevant authorization?
實驗所能否有效地確保核准簽署人員已作出授權及相關授權的可追溯性；
- Whether the full name of the person who approves the signature (same as shown on his or her identity card or passport or other identification documents) is clearly displayed next to the signature; 核准簽署人員的全名(與其身份證或護照等身份證明文件所示相同) 有否在簽署旁清楚顯示；





HKAS On-site Assessment for 'Electronic Test Reports'

香港認可處就試驗所推出的「電子測試報告」所進行的實地評審

- Are the procedures for issuing electronic reports clearly documented in the relevant quality management system procedures?
電子報告的發佈程序是否已在相關的質量管理系統程序中清晰記錄；
- Whether relevant electronic records are retained in the format in which the electronic report was originally sent?
相關電子記錄是否按照電子報告最初發送時的格式保留；及
- Has the laboratory arranged appropriate training for relevant personnel?
實驗所有否為相關人員安排適當的培訓。

HKAS On-site Assessment for 'Automated Test System' 香港認可處就試驗所推出的「自動化測試系統」所進行的實地評審

- Verify effectiveness and authorization for use of new systems prior to implementation;
在實施新系統之前驗證其有效性和獲得授權使用；
- Prevent data from being accessed by unauthorized persons;
防止數據被未經授權的人員存取；
- Effectively prevent data from being tampered with and lost;
有效地防止數據被篡改和丟失；



HKAS On-site Assessment for 'Automated Test System' 香港認可處就試驗所推出的「自動化測試系統」所進行的實地評審

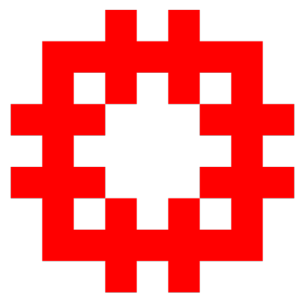
- Ensure data and information integrity when maintaining systems; and
在維護系統時確保數據和信息的完整性；及
- Accurately document system failure conditions and
take appropriate corrective actions.
準確地記錄系統故障情況以及採取適當的
糾正措施。





Advantages of Adopting Electronic Test Certificates/Reports 採用電子測試證書/報告的好處

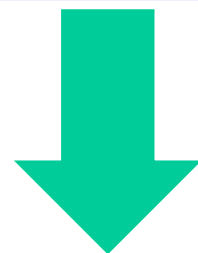
- Early receipt of test reports by users
用戶儘早收到測試報告
- Environmentally friendly 環保
- Reduce storage space 減少儲存空間
- Enhance integrity and traceability
增強完整性和可追溯性
- Big data for reporting, analysis, investigation, research and prediction using electronic means such as AI
利用人工智慧等電子手段進行報告、分析、調查、研究和預測的大數據



香港特別行政區政府
房屋署



工務試驗所



**Standardised
test report templates
標準格式測試報告**





Standardised test report templates

標準格式測試報告

- Compressive strength of concrete cubes
混凝土磚抗壓測試
- Compressive strength of concrete cores
混凝土芯樣抗壓測試
- Test report of steel reinforcing bars
鋼筋測試
- Tensile test of structural steel
結構鋼拉力測試
- Chemical test of steel reinforcing bars
鋼筋化學測試



Test Report**on Compressive Strength of Concrete Cubes**

Test Report No. :

Page :

Test Method : IS:2010 Section 12

Date of Issue :

Sample Details as Supplied by Customer :

Customer : _____ W.O. No. / Job No. : _____
 Address : _____ Contract No. : _____ Audit / Request No. : _____
 Project / Site : _____
 Location in Works of : _____
 Concrete Batch Sampled : _____
 Supplier : _____ Supply Plant : _____
 Source of Coarse Agg. : _____ Source of Fine Agg. : _____
 Cement Brand : _____ Admixture Brand : _____
 Concrete Mix I.D. No. : _____ Dosage : _____
 Concrete Grade : _____ Designed / Measured Slump : _____
 Cement Content : _____ W/C Ratio : _____ A/C Ratio : _____
 PFA/GGBS Content : _____ PFA/GGBS Source : _____
 Date of Sampling / Casting : _____ Time of Adding Water to Mix : _____
 Time of Sampling : _____ Place / Time of Making Cube : _____
 Source of Sampling : _____ Name of Person Making Cubes : _____
 Method of Compaction : _____ Max. / Min. Curing Temperature at site : _____
 Site Curing Method : _____ Nominal Size : _____ Test at Age of : _____
 No. of Cubes for the Same Sample : _____

Certificate of Sampling, Slump Test, Cube Making and Curing :

Certificate of sampling, slump test, cube making and curing [] is available and a copy is attached [] is available but not attached [] is not available

Laboratory Information and Test Results :

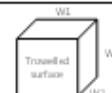
Date Received : _____ Date Tested : _____ Cube Age at Test : _____
 Curing Method : _____ Max. / Min. Curing Temp : _____ Testing Machine ID. : _____
 Test Location : _____ Loading rate : 0.4M Pa/s to 0.8 MPa/s

RFID Tag No. / Security label No.			
Identification no. of Cube mark			
Cube	Lab Ref No.		
	Mould no.		
Condition on received*			
Edges/corners damaged**			
Dimensions	W1 - width 1	mm	
	W2 - height		
	W3 - width 2		
Mass	as received	kg	
	saturated in air		
	in water		
Density***	by calculation	kg/m ³	
	by water displacement		
Maximum load at failure		kN	
Compressive strength****		MPa	
Type of fracture*****			

Notes :

- * N - Normal, H - Honeycombing, P - Poor Compaction, I - Irregular Shape, O - Oversize
- U - Undersize, D - Surface Dry, W - Surface Wet, M - Immersed in Water
- ** Y - for cubes having broken edges/corners with a dimension of 20mm or more in any direction
- N - for cubes without broken edges/corners or having broken edges with a dimension less than 20mm in any direction
- *** Determination of density is in accordance with IS:2010 Section 16.
- **** Compressive strength is based on measured loaded cross-sectional area (W1 x W2).
- ***** S - Satisfactory failure, U - Unsatisfactory failure (Please specify Pattern Number by referring Figure 13 in Section 12 of IS:2010.

If the failure pattern cannot be found in Figure 13, the laboratory is required to record the unusual fracture.)



All test results relate only to the sample(s) tested.

Remark:

Checked by : _____

Approved Signatory : _____

(Full name of Approved Signatory)

-END-

HOKLAS has accredited this laboratory (Reg. No. HOKLAS 2000) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. This report shall not be reproduced except in full without prior written approval from the laboratory.

Standardised test report template for compressive strength of concrete cubes

混凝土磚抗壓測試的標準格式測試報告

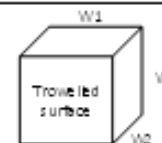
Laboratory Information and Test Results :

Date Received :	Date Tested :	Cube Age at Test :
Curing Method :	Max. / Min. Curing Temp. :	Testing Machine ID. :
Test Location :		Loading rate : 0.4 MPa/s to 0.8 MPa/s

RFID Tag No. / Security label No.			
Identification no. of cube	Cube mark		
	Lab Ref. No.		
Mould no.			
Condition on received*			
Edges/corners damaged**			
Dimensions	W1 - width 1	mm	
	W2 - height		
	W3 - width 2		
Mass	as received	kg	
	saturated in air		
	in water		
Density***	by calculation	kg/m ³	
	by water-displacement		
Maximum load at failure			kN
Compressive strength****			MPa
Type of fracture*****			

Notes :

- * N - Normal, H - Honeycombing, P - Poor Compaction, I - Irregular Shape, O - Oversize
- U - Undersize, D - Surface Dry, W - Surface Wet, M - Immersed in Water
- ** Y - for cubes having broken edges/corners with a dimension of 20mm or more in any direction
- N - for cubes without broken edges/corners or having broken edges with a dimension less than 20mm in any direction
- *** Determination of density is in accordance with CS1:2010 Section 16.
- **** Compressive strength is based on measured loaded cross-sectional area (W1 x W2).
- ***** S - Satisfactory failure, U - Unsatisfactory failure (Please specify Pattern Number by referring Figure 13 in Section 12 of CS1:2010. If the failure pattern cannot be found in Figure 13, the laboratory is required to record the unusual fracture.)



All test results relate only to the sample(s) tested.

Remark:

Checked by : _____

Approved Signatory : _____

(Full name of Approved Signatory)



Test Report**on Steel Reinforcing Bars**

Test Method:

Test Report No.:

Mass per meter, Re bend test and Surface geometry : CEN 2012 (Rev. S) Cl. 6.1, 6.2, 6.5 & 6.7.2 (with modification)

Page:

Tensile test: BS EN ISO 6892-1:2009 Cl. 10.4 Method B (or Cl. 10.3 Method A) & CEN 2012 (Rev. S) Cl. 6.1 & 6.4

Date of Issue:

*(The text in RED is subject to the test procedure of the laboratory.)***Sample Details as Supplied by Customer :**

Customer : _____ Contract No. : _____
 Address : _____ W.O. No. / Job No. : _____
 Project / Site : _____
 Nominal Bar Size : _____ Bar Pattern Code : _____ [Insert steel bar pattern here]
 Steel Grade : _____ Steel Manufacturer : _____
 Country of Origin : _____ Cast / Heat No. : _____
 Class No. : _____ Date delivered to Site : _____
 Batch No. : _____ Stocklist : _____
 Sample Type : _____ Means of straightening of coil sample : _____

Laboratory Test Results

Date Received : _____
 Date Tested : _____ Test Machine No. : _____
 No. of Specimens : _____ Gauge Length for Tensile Test : _____
 Conditions of Aging Treatment : _____

1. Determination of Mass per meter, Tensile properties & Bend performance

Specimen No.			Mass per meter run		Yield strength	Tensile strength	Tensile / yield strength ratio	Total elongation at maximum force	Re bend Test
Laboratory	Customer	RFID Tag No. / Electronic Sample ID	Measured	Deviation from nominal mass per metre					
			(kg/m)	(%)	(MPa)	(MPa)		(%)	

2. Surface Geometry

Specimen No.			Relative Rib Area
Laboratory	Customer	RFID Tag No. / Electronic Sample ID	

- Notes :**
- All test results relate only to the samples tested; the laboratory has no responsibility on sampling and all the test results apply to the samples as received.
 - The measured length of the spacing of the transverse ribs for 40mm and 50mm steel reinforcing bars is less than 10 rib gaps.

(The text in RED is subject to the test procedure of the laboratory.)

Remarks :

Checked By : _____

Approved Signatory : _____
(Full name of Approver/Signatory)

- END -



Standardised test report template for steel reinforcing bars of concrete cubes

鋼筋測試的標準格式測試報告

1. Determination of Mass per meter, Tensile properties & Bend performance

Specimen No.			Mass per meter run		Yield strength (MPa)	Tensile strength (MPa)	Tensile / yield strength ratio	Total elongation at maximum force (%)	Rebend Test
Laboratory	Customer	RFID Tag No. / Electronic Sample ID	Measured (kg/m)	Deviation from nominal mass per metre (%)					

2. Surface Geometry

Specimen No.			Relative Rib Area
Laboratory	Customer	RFID Tag No. / Electronic Sample ID	





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