

HOKLAS Supplementary Criteria No. 17

Construction Materials Test Category – Accreditation of Building Components and Related Tests

1 INTRODUCTION

- 1.1 This criteria document serves to clarify and supplement the requirements of ISO/IEC 17025 for the accreditation of building components and related tests under the test category of ‘Construction Materials’. This criteria document shall be read in conjunction with ISO/IEC 17025, HKAS Policy Document No.1 and relevant HKAS and HOKLAS supplementary criteria documents. The following sections set out specific technical criteria for the building components and related tests which include, but not limited to, those items given in Appendix A.
- 1.2 Laboratories shall comply with all specific requirements of the test methods in addition to the requirements specified in this documents.
- 1.3 For aspects relating to fire resistance tests on building components, reference shall be made to HOKLAS SC-47.

2 PERSONNEL

- 2.1 An **approved signatory** with responsibility for the operation of the accredited building components and related tests shall have the necessary competence (e.g. education, qualification, training, technical knowledge, skills and experience) to ensure the test is performed in accordance with the test method and HKAS requirements. A person holding a recognised degree or equivalent qualification in a relevant discipline, with at least three years of relevant technical and accountable experience, satisfies these requirements. Alternatively, a person with eight years directly relevant technical and managerial experience may be considered acceptable in lieu of formal qualifications.
- 2.2 For testing operators performing wind resistance tests of curtain wall/window/window wall systems, a person in possession of a relevant technical certificate issued by the Institute of Vocational Education or equivalent, with at least one year of on-the-job training on the practical and technical aspects of relevant testing, satisfies these requirements. Alternatively, a person having four years of relevant experience and on-the-job training on the practical and technical aspects of relevant testing also satisfies these requirements.

- 2.3 Each laboratory shall evaluate the technical competence of its test operators for wind resistance testing of curtain wall/window/window wall systems and keeps a list of **qualified operators** for wind resistance testing of curtain walls/windows/window walls who are permitted to perform the concerned tests and sign the worksheets. Record of assessing the competence of the qualified operator(s) shall be kept in the laboratory and ready for examination during each HKAS assessment visit or upon request by HKAS.
- 2.4 Testing personnel shall normally be supervised by a suitable qualified supervisor having the necessary qualification, experience and technical knowledge not less than those of the testing operators for the accredited test. Testing operator shall have the necessary qualifications, experience and technical knowledge to perform the accredited test.

3 EQUIPMENT AND METROLOGICAL TRACEABILITY

- 3.1 General requirements on equipment calibrations are given in the HOKLAS SC-02. Specific requirements on equipment calibration/ verification for various building components and related tests are given in Appendix B of this document. These requirements shall be complied with unless overridden by more stringent requirements stipulated in the relevant test methods.
- 3.2 Where a laboratory has the necessary reference standard or reference material, suitably controlled environment and competent staff, it may perform in-house calibration/verification for its working equipment. Documented internal calibration/verification procedures shall be ready for examination during each HKAS assessment visit. HKAS Executive may require the laboratory to provide the calibration/verification procedures in the briefing notes to the assessment team.

4 SELECTION AND VERIFICATION OF METHODS

- 4.1 The laboratory may carry out the test in accordance with a government specification which details the test procedures and acceptance criterion. HKAS may accept a laboratory's application for accreditation of testing in accordance with government specifications provided that the laboratory can demonstrate its conformity with the whole specification requirements without any modification.

5 HANDLING OF TEST ITEMS AND TECHNICAL RECORDS

- 5.1 Items to be tested shall be identified throughout the test and records of

identification of each test item shall be kept. Such identification shall be such that the area or batch of items specifically tested can be identified against the corresponding test results.

ENSURING THE VALIDITY OF RESULTS

- 6.1 An applicant or accredited laboratory shall conform with the proficiency testing requirements as stipulated in HOKLAS SC-33.

HOKLAS SC-17
Issue No. 6
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Page 4 of 9

APPENDIX A

1. Door & Gate

1.1 Doors may be constructed of timber, glass, metal or plastic, etc. Most doors are required to be fire resistant to fulfill regulatory requirements. The durability and serviceability are also important parameters to be considered on their use in a building.

1.2 The following tests are some examples of the quality testing for doors:

- (a) Fire resistance testing (e.g. BS 476: Part 20 & 22, BS EN 1364-1 & 2 etc.). Reference should be made to HOKLAS SC-47.
- (b) Sound resistance testing (e.g. ISO 140 etc.)
- (c) Strength testing (e.g. impact & torsion to Hong Kong Housing Authority Specifications etc.)
- (d) Humidity variations testing (e.g. BS EN 1294, BS EN 43 etc.)
- (e) Flatness, evenness, jarring, slamming, vibration, obstruction testing (e.g. Hong Kong Housing Authority Specification etc.)

2. Curtain Wall, Window & Window Wall Systems

2.1 The common materials used for curtain wall, window and window wall systems are glass and aluminum. As a regulatory requirement, curtain walls, windows and window walls are required to undergo a safety test to confirm that they will perform satisfactorily and be wind resistant when subject to strong wind and typhoon.

2.2 The following tests are some examples of the quality testing for curtain wall, window and window wall systems:

- (a) Wind resistance testing (e.g. PNAP APP-37, BS 5368: Part 3, EN 77, ASTM E330 etc.)
- (b) Static water penetration testing (e.g. BS 5368: Part 2, EN 86, ASTM E331 etc.)
- (c) Air permeability testing (e.g. BS 5368: Part 1, EN 42, ASTM E283 etc.)

- (d) Dynamic water infiltration testing (e.g. AAMA 501.1 etc.)
- (e) Sound resistance testing (e.g. ISO 140 etc.)
- (f) Strength testing (e.g. BS 6202 on impact strength etc.)
- (g) Fire resistance testing (e.g. BS 476: Parts 20 & 22, BS EN 1364-1 & 2 etc.).
Reference should be made to HOKLAS SC-47.
- (h) Non-combustibility testing for curtain wall materials (e.g. BS476: Part 4 etc.). Reference should be made to HOKLAS SC-47.
- (i) Thermal resistance testing
- (j) Gaskets & sealant testing (e.g. BS 5889, BS 4255, ISO 8339 etc.)

3 Building Stone, Tile & Cladding

3.1 Building stones and tiles are used extensively in a building both externally and internally for protection as well as decoration. Building stones comprise natural stones such as granite, limestone, marble, gneiss & sandstone. Tiles and claddings are manufactured building products.

3.2 The following tests are some examples of the quality testing for building stones, tiles & cladding:

- (a) Flexure strength of building stone (e.g. ASTM C880, BS EN 12372 etc.)
- (b) Proof-load of anchor bolts for facing stones & cladding (e.g. BS 5080: Part 1 etc.)
- (c) Water absorption of building stones (e.g. ASTM C97 etc.)
- (d) Tile adhesive testing (e.g. shear & tensile to BS 5980 etc.)
- (e) In-situ pull-off testing of ceramic & mosaic tiles
- (f) Tiles testing (e.g. flatness, rectangularity, straightness, thickness, water absorption, modulus of rupture, Mohs hardness, resistance to thermal shock & to surface abrasion to BS 6431: Parts 10-20 etc.)

4 Water & Drainage Pipe

4.1 Pipes for supply of fresh & flush water, for fire services to, and for drainage of storm & waste water from buildings are probably the most essential elements of building components which affect the health and comfortability of inhabitants in a building.

4.2 The following tests are some examples of the quality testing for pipes below ground:

- (a) Crushing strength, hydrostatic pressure and water absorption testing of concrete, vitrified clay, ductile iron, UPVC pipes (e.g. BS 5911: Part 200, BS 56, BS 4772, BS 4622, BS 3506, BS 4660, BS EN 545, BS EN 598, BS EN 969 etc.)

4.3 The following tests are some examples of the quality testing for pipes above ground:

- (a) Hydrostatic pressure testing (e.g. BS 1387 etc.)
- (b) Resistance to cycle pressure shock (e.g. BS 7291: Part 1 etc.)
- (c) Corrosion resistance testing (e.g. BS 6920: Part 1 etc.)
- (d) Adhesive strength, bending & flattening testing (e.g. Hong Kong Housing Authority Specifications etc.)

5 Cooking Bench & Sink Unit

5.1 The following tests are some examples of the quality testing for cooking bench & sink units:

- (a) Shear & flexural strength, effect of localized heating, robustness & strength under repeated imparted force testing (e.g. Hong Kong Housing Authority Specifications etc.)

APPENDIX B

SPECIFIC CALIBRATION/VERIFICATION REQUIREMENTS

This appendix lists the current recommended specific calibration requirements for equipment of building components and related tests.

General		
Type of equipment	Recommended maximum period between successive calibrations/verification	Recommended calibration/verification procedure or guidance documents and equipment requirements
Balance	Refer to HOKLAS SC-02 App. E	Refer to HOKLAS SC-02 App. E
Caliper and micrometer	Refer to HOKLAS SC-02 App. E	Refer to HOKLAS SC-02 App. E
Force measuring device (proving ring, transducer or load cell)	Every year	By a 'competent calibration body' as defined in clause 2.1 of HOKLAS SC-02
Force testing machine (compression or tension)		
(a) Load verification	Every 6 months	By a 'competent calibration body' as defined in clause 2.1 of HOKLAS SC-02 to an appropriate standard (BS, EN, ASTM or ISO etc)
(b) Load rate	Every month	In accordance with appropriate standards
Pressure gauge (hydraulic or transducer types)	Refer to HOKLAS SC-02 App. E	Refer to HOKLAS SC-02 App. E (The use of a pressure gauge in a hydraulic jack to measure forces is not accepted)
Time measuring device	Refer to HOKLAS SC-02 App. E	Refer to HOKLAS SC-02 App. E

Curtain Wall, Window & Window Wall Systems Test

Type of equipment	Recommended maximum period between successive calibrations/verification	Recommended calibration/verification procedure or guidance documents and equipment requirements
Pressure chamber	Every year	Check uniformity of pressure distribution for at least three points at the same time
Pressure transducer	Every year	By a 'competent calibration body' as defined in clause 2.1 of HOKLAS SC-02
Displacement transducer	Every year	By a 'competent calibration body' as defined in clause 2.1 of HOKLAS SC-02 or calibrate using a micrometer type calibrator.
	Before use	One-point check using a gauge block
Flowmeter or rotameter	Every year	By a 'competent calibration body' as defined in clause 2.1 of HOKLAS SC-02

Acoustic Test		
Type of equipment	Recommended maximum period between successive calibrations/verification	Recommended calibration/verification procedure or guidance documents and equipment requirements
Acoustic calibrator	Every year	By a ‘competent calibration body’ as defined in clause 2.1 of HOKLAS SC-02
Frequency analyser	Every five years	By a ‘competent calibration body’ as defined in clause 2.1 of HOKLAS SC-02
Frequency response tracer	Every year	By a ‘competent calibration body’ as defined in clause 2.1 of HOKLAS SC-02
Frequency standard	Every five years	By a ‘competent calibration body’ as defined in clause 2.1 of HOKLAS SC-02
Microphones	Every year or when 1 dB change is detected, whichever is sooner	By a ‘competent calibration body’ as defined in clause 2.1 of HOKLAS SC-02
	Every three months	Using a reference device
Sound level meter	Every two years	By a ‘competent calibration body’ as defined in clause 2.1 of HOKLAS SC-02
	Every three months	Using a reference device
	Before use	Using sound level calibrator