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HOKLAS Supplementary Criteria No. 47

Construction Materials Test Category – Accreditation of Fire Testing

0 Introduction

- (a) This document serves to clarify and supplement the requirements of ISO/IEC 17025:2017 and HKAS Policy Document No. 1 for accreditation of laboratories performing fire testing under the test category of ‘Construction Materials’. It should be read in conjunction with the current of ISO/IEC 17025:2017 and other relevant accreditation criteria documents. The fire testing includes, but not limited to, the following tests:
- (i) Fire resistance tests on non-loadbearing elements of construction, such as partitions, doorsets, shutter assemblies, ceiling membranes and glazed elements, etc.¹
 - (ii) Fire resistance tests on loadbearing elements of construction, such as columns, floors, flat roofs, and walls, etc.¹
 - (iii) Smoke control tests on smoke control doors and shutters, etc.¹
 - (iv) Reaction to fire tests, non-combustibility test for materials¹
- (b) In addition to the requirements stipulated in this document, a laboratory shall comply with specific requirements of the test methods.
- (c) Assessment of the fire performance of a passive fire protection product when there are any changes to the product which has been tested is outside the scope of HOKLAS accreditation for fire testing. Accreditation may however be granted to a laboratory for conducting the field of direct application of fire test results, such as BS EN 1634-1, provided that the laboratory performs the fire test itself under the same standard and that the field of direct application forms part of the test report.

1 Scope

(No additional explanation)

¹ Examples of test standards can be found in ‘Code of Practice of Fire Safety in Buildings’ published by Buildings Department of the Government of the HKSAR.

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2 Normative references

(No additional explanation)

3 Terms and definitions

(No additional explanation)

4 General requirements

(No additional explanation)

5 Structural requirements

(No additional explanation)

6 Resource requirements

6.1 General

(No additional explanation)

6.2 Personnel

- (a) An **approved signatory** with responsibility for the operation of the accredited laboratory on fire 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 engineering or science degree with at least three years' solid experience in fire testing or fire engineering satisfies these requirements. Alternatively, a person with eight years directly relevant technical and managerial experience may be considered acceptable in lieu of formal qualifications.
- (b) A **test operator** conducting fire resistance tests and/or smoke control tests on elements of construction shall hold a recognised technician certificate or equivalent technical qualification issued by a recognised technical institute/tertiary institution or an equivalent qualification and shall have at least one year of relevant working experience. Alternatively, a person having at least four years' solid experience in fire testing may be considered acceptable in lieu of formal qualifications.
- (c) Each laboratory shall evaluate the technical competence of its test operators and keeps a list of qualified operators for fire resistance tests and smoke control tests on elements of construction who are permitted to perform the

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concerned test 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.

- (d) For fire resistance tests and smoke control tests on elements of construction, an approved signatory shall assess the performance of the operators regularly. Records of such assessment and findings shall be kept.

6.3 Facilities and environmental conditions

(No additional explanation)

6.4 Equipment

- (a) General requirements on equipment calibrations are given in HOKLAS SC-02. Specific requirements on equipment calibration/verification intervals for fire tests are given in the Appendix of this document. These requirements shall be complied with unless overridden by more stringent requirements stipulated in the relevant test methods.
- (b) The laboratory shall ensure furnace and temperature measuring devices, such as, internal and unexposed surface thermocouples, comply with relevant test methods. In particular, the laboratory shall keep the usage and disposal records of the thermocouples.
- (c) For the tests where the fuel type and/or purity are specified in the test method, the laboratory shall verify that the purchased fuel complies with the requirements before conducting the tests.

6.5 Metrological traceability

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.

6.6 Externally provided products and services

(No additional explanation)

7 Process requirements

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7.1 Review of requests, tenders and contracts

(No additional explanation)

7.2 Selection, verification and validation methods

- (a) For fire resistance tests where the test method allows measurements or observations be made at a frequency determined by the condition of the element, the laboratory shall document the detailed procedure to cope with all possible circumstances for the test specimens being tested according to the test methods in the scope of accreditation. The measurements and observations which are crucial to the failure of the test specimen shall be made periodically at a sufficiently high frequency such that the time when failure of the test specimen occurs can be recorded with the accuracy required by the test methods. In particular, the test procedures shall describe how the integrity, insulation, stability status, if applicable, of the test specimen can be confirmed by making measurements and/or observations at the expected fire resistance period of the test specimen.
- (b) Whilst some test methods for fire resistance tests on elements of construction allow more than one specimen be tested simultaneously, the laboratory shall ensure that the test results of individual specimen would not be affected by the presence of other specimens. For example, the laboratory shall ensure that premature failure of one specimen would not affect the testing conditions, particularly the temperature and pressure conditions, of the remaining specimens being tested.
- (c) The laboratory shall provide sufficient manpower and resources to conduct the tests in accordance with the test procedures. When more than one specimen is being tested simultaneously, the laboratory shall ensure that there are sufficient test operators and equipment available such that measurements and observations would be made at the frequency and in the manner according to the test procedure.
- (d) For fire resistance tests and smoke control tests on elements of construction, the laboratory shall issue clear testing instructions to test operators to ensure that the test operators follow all the steps required in the test methods.

7.3 Sampling

(No additional explanation)

7.4 Handling of test or calibration items

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(No additional explanation)

7.5 Technical records

- (a) For fire resistance tests on elements of construction, high resolution digital video records shall be taken and kept. The video records shall be able to show clearly the whole test specimen and its identification and shall cover the whole process of the test. The quality of the video shall be high enough to enable the approved signatory to review the test process and test results from the video records. High resolution digital photographic records shall also be taken and kept such that the construction details, components, fixing details of the test specimen before test, essential stages of the test and the result yielding stage of the test are recorded. The digital photographs and videos shall include information on the time and dates when they are taken.
- (b) The laboratory shall have procedures to protect and back-up records stored electronically and to prevent unauthorised access to or alteration of these records.

7.6 Evaluation of measurement uncertainty

(No additional explanation)

7.7 Ensuring the validity of results

- (a) An applicant or accredited laboratory shall conform with the proficiency testing requirements as stipulated in HOKLAS SC-33.
- (b) Fire testing is considered as a test area for the purpose of determining the proficiency testing activities required by the HOKLAS SC-33.
- (c) The approved signatory shall critically review all records, including but not limited to, test worksheets, temperature and pressure records, and the records required in clause 7.5 to ensure the accuracy of the test results, with particular attention paid to critical stages of the test, for example, at the expected fire resistance period of the test specimen.

7.8 Reporting of results

- (a) Some test methods require the reporting of construction details, materials used, dimensions and conditions of the assembly as tested, with detailed drawing, and important physical properties of materials or components, including the condition and the means by which this was achieved. The laboratory shall have a detailed procedure to check all these information of

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the test specimen upon receipt, during and after its installation and, where appropriate, after the fire test. Digital photographic records for all important details and components of the test specimen shall be kept. Such checking records shall be kept as part of the technical records.

- (b) To ensure all construction details of the test specimen can be checked properly, the laboratory shall communicate with the customer to obtain the detailed as-built drawings and detailed description, such as technical data sheets, of the test specimen and conduct the checking of the information shown on the drawings and technical data sheets before commencement of the fire test. If there are discrepancies between the test specimen and the details shown on the drawings and technical data sheet, the laboratory shall confirm with the customer if amendments to the drawings would be required. The laboratory shall maintain the communication records with the customer and the relevant amendment records.
- (c) If it is not feasible for the laboratory to check some of the information due to practical reasons, such as the composition and conditions of the interior of the fire doors, the laboratory shall indicate clearly and unambiguously in the test report the details which have not been verified by the laboratory and the source of information.

7.9 Complaints

(No additional explanation)

7.10 Nonconforming work

(No additional explanation)

7.11 Control of data and information management

(No additional explanation)

8 Management system requirements

(No additional explanation)

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APPENDIX

SPECIFIC CALIBRATION/VERIFICATION REQUIREMENTS

This appendix lists the current recommended specific calibration/verification requirements for equipment of fire testing. Where conflicting criteria exist for the below equipment between this appendix and any other HKAS publications, the recommended criteria of this appendix shall take precedence if the equipment is used for fire testing.

Type of equipment	Recommended maximum period between successive calibration/verification	Recommended calibration/verification procedure or guidance documents and equipment requirements
Balance	Refer to HOKLAS SC-02	Refer to HOKLAS SC-02, Appendix E
Caliper and micrometer	Refer to HOKLAS SC-02	Refer to HOKLAS SC-02, Appendix 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
(b) Load rate	Every month	In accordance with appropriate standards
Time measuring device	Refer to HOKLAS SC-02	Refer to HOKLAS SC-02, Appendix E
Pressure measuring device (to measure furnace pressure)	Every year	By a 'competent calibration body' as defined in Clause 2.1 of HOKLAS SC-02
Deformation measuring device	Every year	By a 'competent calibration body' as defined in Clause 2.1 of HOKLAS SC-02 or calibrate using a micrometer type calibrator

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Type of equipment	Recommended maximum period between successive calibration/verification	Recommended calibration/verification procedure or guidance documents and equipment requirements
Irradiance indicator or radiometer	Every four years	By a ‘competent calibration body’ as defined in Clause 2.1 of HOKLAS SC-02
Oven	Refer to HOKLAS SC-02	Refer to HOKLAS SC-02, Appendix E
Roving surface thermocouple	Every three years	By a ‘competent calibration body’ as defined in Clause 2.1 of HOKLAS SC-02
Furnace	During test	Checking of uniformity of temperature and pressure distributions in accordance with appropriate standards
Thermocouple (for fire door testing to 1250 °C and below)	Every year or according to a relevant standard, whichever is earlier	By a ‘competent calibration body’ as defined in Clause 2.1 of HOKLAS SC-02. At least a calibrated or three ‘well proven’ thermo-couples of each type (i.e. the unexposed face thermocouples and the furnace thermocouples) shall be used among all the thermocouples in a test. At least three thermocouples in each identified and traceable coil (length ≤ 100m)/batch (quantity ≤ 50 pieces) from a reputable manufacturer with manufacturer’s certificate (namely the first, the middle & the last pieces) shall be calibrated by a ‘competent calibration body’ with suitable identification. The others pieces shall be identified accordingly as the same coil/batch.