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# HKIAS Supplementary Criteria No. 2

## Construction Products Inspection – General Products

### 0 Introduction

- (a) This document serves to clarify and supplement the requirements of HKIAS 003:2017 for the accreditation of construction products inspection. It should be read in conjunction with HKIAS 003:2017 and other relevant criteria documents.
  
- (b) The general construction products inspection includes, but not limited to, building, highway and precast products, paint and waterworks products.

### 1 Scope

(No additional explanation)

### 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

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## 6.1 Personnel

6.1.1 HKIAS operates an approved inspector system for general construction products inspection. The nominees shall have obtained, as a minimum, a certificate in an engineering, technology or science discipline issued by a recognised technical institute, or equivalent, and they shall have a minimum of one year of relevant inspection experience. In exceptional cases, extensive inspection experience may also be accepted in lieu of academic qualification. The inspector shall be able to communicate effectively with personnel at the inspection site.

6.1.2 Nominees for signatory approval for signing HKIAS endorsed inspection reports and certificates shall have, as a minimum, a degree in an engineering, technology or science discipline issued by a recognised tertiary institution, university, or equivalent. In exceptional circumstances, extensive experience in general construction products inspection, say, more than 8 years, may be accepted in lieu of formal academic qualification. Other requirements for approved signatories are detailed in HKIAS 003:2017.

6.1.3 To safeguard against any impropriety of the inspector and attempts to exert improper influence on them by the suppliers, the inspection body shall take appropriate actions. The system may include a combination of the following elements:

- a. Providing proper relevant education to inspectors;
- b. Issuing a code of ethics to inspectors;
- c. Job rotation for inspectors;
- d. Unannounced on-site visits by auditors or supervisors to check the inspection results;
- e. Taking disciplinary actions and legal sanction against inspectors practicing impropriety;
- f. Comparing the inspection against samples kept by the

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inspection body;

- g. Comparing the average pass-fail rate of an inspector with other inspectors;
- h. Asking inspectors to record their inspection actions in details;
- i. Asking suppliers to sign to acknowledge the inspection body's policy on not exerting improper influence before conducting the inspection;
- j. Providing immediate feedback channel for inspectors to report attempts of suppliers to exert improper influence; and
- k. Informing bodies or clients of parties attempting to exert improper influence.

6.1.4 When training inspectors, emphasis shall be given to:

- a. Requirements of the quality system;
- b. Expected standard of conduct and ethics;
- c. Rationale and practice of keeping information confidential;
- d. The quality assurance plan employed by the inspection body to assure the quality of results; and
- e. The importance of adhering to documented quality procedures.

6.1.5 For new or inexperienced inspectors, a structured training program covering the following aspects shall be conducted:

- a. Principle and practice of inspection;
- b. Inspection methods and procedures, sampling methods and procedures and their selection;
- c. Acceptance criteria and classification of defects;
- d. Interpretation of inspection requirements and standards and product specifications for the products to be inspected;
- e. Statistical techniques and sampling plans;
- f. Identification of samples and sub-samples;
- g. Preservation of samples and environmental condition requirements for sampling and inspections;
- h. Principle and operation of relevant measuring and sampling

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equipment, including automatic ones. The criteria for their selection, including accuracy requirements for a given inspection. Where it is necessary to use equipment not under the control of the inspection body to conduct inspection or sampling, the inspectors must be trained to conduct the necessary on-site verification checks;

- i. Factors affecting the accuracy of inspection results, including those contributed by the sampling and inspection method, sampling and inspection equipment, their calibration and traceability, and competence of the inspectors;
- j. Recording of the inspection details and results;
- k. Checking of inspection results;
- l. Drawing conclusion based on inspection results; and
- m. Introduction to the manufacturing technology of the products to be inspected, including the quality control and quality assurance practice, and the characteristics of the products.

6.1.6 After training, the competence of the trainees shall be assessed. Only inspectors appraised to be competent shall be allowed to carry out inspection work independently.

6.1.7 Where an inspector is required to carry out new inspections or use new inspection procedures or equipment, appropriate training shall also be provided and competence assessment shall follow.

6.1.8 When an inspector has acquired sufficient inspection experience in a certain field, he/she may be trained to make professional judgements in that field. Inexperienced inspectors shall not be allowed to make professional judgements.

6.1.9 Appropriate training shall also be provided to staff members conducting other technical and administrative work.

6.1.10 The training system, the training provided and records of trainee appraisal shall be documented.

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6.1.11 It is useful to keep a competence log listing which inspectors are competent to perform what inspections and for what types of construction product. Supervisors may assign inspection jobs to suitable inspectors according to this log.

6.1.12 Applicant and accredited inspection bodies shall ensure that colour vision and other sensory deficiency of inspectors will not affect the validity of inspection results.

6.1.13 Inspectors shall be properly supervised. Where on-site supervision is impracticable, inspection bodies shall establish and implement an effective feedback system to monitor the conduct and performance of inspectors.

## 6.2 Facilities and equipment

6.2.1 For equipment which has significant effect on the inspection or sampling results, it is required that the inspection body shall use the equipment under its control to perform inspections and sampling. Appendix A sets out the calibration/verification requirement for some of the necessary equipment for the inspection. Where this is impracticable, equipment not under its control may be used after the inspectors have verified that the equipment is suitable for the purpose, including its measurement range, accuracy and calibration traceability. Records of verification shall be kept, standard verification procedures shall be provided and the inspectors shall be trained to conduct such verification checks. Where necessary, the inspectors shall also be provided with the necessary reference standards or equipment to conduct the verification checks.

6.2.2 To ensure that the necessary equipment is available on-site, the inspection body shall consult beforehand with the responsible person nominated by the supplier at the inspection site to confirm whether equipment of the necessary specifications and quality, including

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calibration traceability, is available.

6.2.3 When an inspector brings his own equipment, he/she shall perform a verification check on arrival at the site to ensure that its function and calibration have not been affected by transportation. Such checks shall be recorded.

6.2.4 When electronic means are used for the processing, storage and transfer of information, the systems shall satisfy the requirements of HKAS 002, HKIAS 003:2017 and this Supplementary Criteria. Particular attention shall be paid to the validation of software, safety and security of information, maintenance of confidentiality and identity authentication.

### 6.3 Subcontracting

(No additional explanation)

## 7 Process requirements

### 7.1 Inspection methods and procedures

7.1.1 Inspection bodies shall provide adequate and up-to-date documented work instructions to inspectors to ensure that all the inspections are performed according to the requirements and acceptance criteria of the clients. Proforma worksheets or log books for recording results and other details of inspections shall also be provided.

7.1.2 Where a client does not specify an inspection specification or the specification is incomplete, the inspection body shall discuss with the client and agree on a suitable specification. The inspection specification, whether provided by the client or suggested by the inspection body, shall be documented. Where an alleged up-to-date inspection specification is provided to the inspector on-site, for replacing the specification provided by the inspection body, the

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inspector shall verify that the updated inspection specification is issued by the client and is applicable to the inspection to be conducted. A documented procedure governing such cases shall be provided by the inspection body.

7.1.3 Work instructions provided to inspectors shall include the following information:

- a. What are to be inspected, including the type of inspection (e.g. pre-shipment), identification of the product, the quantity of the product, the location where inspection is to be performed and the contact person, the inspection time and date and any other relevant general information;
- b. The sampling method, including the sampling plan and the sample size; the inspection method, including features of the products to be examined;
- c. The inspection and sampling equipment to be used;
- d. Instructions for recording inspection findings;
- e. Details and quantity of any samples to be sent back to the inspection body for further examination or testing;
- f. The method for affixing identification marks to inspection samples and sub-samples, where necessary;
- g. The acceptance criteria, including the workmanship standard and classification of observed defects shall be classified. Where the client provides reference samples against which the products to be inspected are to be compared, these standard samples shall be provided to the inspector. The inspection body shall have a system for identification of reference samples to avoid confusion; and;
- h. Any special requirements and instructions relevant to the inspection, e.g. instruction for inspection and sampling equipment, environmental condition requirements and preservation of the collected samples.

7.1.4 Where the environmental conditions affect the inspection or sampling results, the inspection body shall ensure that they are within the

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specified limits and are recorded in the inspection records. It may be necessary for the inspector to bring the necessary monitoring equipment.

7.1.5 To unify the basis of making professional judgements based on the inspection results, the inspection body shall establish and document appropriate guidelines.

7.1.6 The samples selected for inspection shall be representative of the batch of product. Random sampling shall be used unless there is an evidence to show that an alternative sampling selection method will give equally representative results.

7.1.7 The inspection body shall ensure that proper arrangements and permission for inspection have been made with the owner of the product to be inspected prior to performing the inspection.

7.1.8 Where the sampling procedure is labour intensive, the inspection body shall make prior agreement with the supplier or other responsible party to ensure that sufficient manpower is available to assist the inspector.

7.1.9 Before carrying out an on-site inspection, the inspector shall brief the responsible person of the site on the purpose and procedure of the inspection and solicit his cooperation.

## 7.2 Handling inspection items and samples

7.2.1 Samples and items to be inspected shall be uniquely identified to avoid confusion regarding their identity at any time. Where there is a need to identify the exact sources or origins of individual sub-samples, it may be necessary to assign a unique code to each sub-sample and record the details of its origin, e.g. the carton number, the time and date when the sub-sample is taken from which production line, etc. These identification codes shall be referenced in the inspection records.

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7.2.2 Where it is necessary to send samples to laboratories for testing or retain samples for reference, the inspection body shall ensure that they are adequately identified to avoid confusion.

7.2.3 Where there is a need to keep inspected samples, e.g. to show what defects have been observed, consent of the owner shall be obtained. The procedures for the disposal of retained samples shall also be agreed with the owner. Before disposing, samples may have to be destroyed to an extent such that client information confidentiality is maintained.

### 7.3 Inspection records

7.3.1 Inspection records shall include sufficient information to permit satisfactory evaluation of the inspection. The record system shall permit the ready retrieval of information supporting the results reported to the client. In general, the following items of information shall be kept:

- a. What have been inspected, including the type of inspection (e.g. pre-shipment), identification and quantity of the inspected product, the inspection location, the identities of the inspectors, the inspection time and date where relevant, the identity of the client and any other pertinent information;
- b. Identification of the inspection and sampling method, including the sampling plan and sample size, and any deviations from them;
- c. The identification and specification of the equipment used, where relevant. Where equipment not under the control of the inspection body is used for the inspection or sampling, verification records for the equipment must be kept;
- d. Environmental conditions during inspection and sampling, where relevant;
- e. Clear and unambiguous inspection findings, including any findings obtained from samples sent back to the premises of the inspection body for further examination and testing and results

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obtained by any subcontractor. Details of any defects or abnormality (which may not constitute a defect) observed shall be recorded. Diagrams and photographs are sometimes useful;

- f. Identifications of the source and origin of individual sub-samples, where necessary;
- g. Identification of the acceptance and defect classification criteria;
- h. Rationale and basis of any conclusion and professional judgement; and
- i. Evidence that the inspection results have undergone all the necessary quality assurance checks, e.g. the identity and signatory of the checking and reviewing staff member.

7.3.2 To enable results checking and verification or to demonstrate the validity of the results, more information may have to be recorded. For example, photographs and video image may have to be taken and kept to demonstrate that the samples have been correctly taken or to show the details of any observed defects.

7.3.3 For record traceability, it may be useful to include the report number, or an equivalent identification number on every document relating to that inspection.

7.3.4 Supplementary information required for the interpretation of the recorded data shall also be kept. Samples may also be kept for reference.

7.3.5 Before issuing the final inspection result to the client, the inspection body shall ensure that all the inspection results, calculation, data transfer, inspection conclusions and professional judgements have been properly checked. Checks shall confirm the following:

- a. The instructions of the clients have been accurately and comprehensively executed;
- b. Proper inspection and sampling methods have been used;
- c. The inspection has been performed by qualified inspectors;

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- d. The equipment used are suitable and properly checked and calibrated;
- e. Samples have been obtained according to the sampling plan, including the location, size, environmental condition, etc.;
- f. Samples and where necessary, sub-samples have been properly identified;
- g. Data transfer, calculations and conclusions have been correctly made;
- h. The inspection findings have been properly recorded and all records are traceable.
- i. All necessary data required for arriving at the conclusion, including results obtained from any laboratory or subcontractor, have been obtained;
- j. Observed defects have been properly classified;
- k. The conclusions have been properly derived from the inspection findings;
- l. Any professional judgements have been properly made in accordance with any guidelines issued by the inspection body and the basis of the professional judgement has been clearly recorded; and
- m. Information included in reports and certificates are correct.

The checker shall sign on the record sheet to authenticate that the results have been properly checked. Other alternative means of authentication providing equivalent assurance is also acceptable.

#### 7.4 Inspection reports and inspection certificates

7.4.1 Where it is necessary to issue interim results on-site, the inspection results shall be adequately checked, preferably by a staff member of the inspection body other than the one performing the inspection. The checker shall sign the inspection record and the interim report to indicate that he/she has carried out the checks. The interim report shall clearly state that the results are not final and may be amended after reviewing by the inspection body. The inspection body shall ensure that

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issuing of such an interim document is allowed by the client and it is given only to the person he/she has designated. The format of the interim report shall be designed to present the results clearly and unambiguously. The inspection body shall also ensure that only inspectors appraised to be competent to issue interim reports are allowed to do so. They shall also be properly authorised for issuing such reports. Such interim reports shall not bear any HKIAS endorsement.

#### 7.5 Complaints and appeals

(No additional explanation)

#### 7.6 Complaints and appeals process

(No additional explanation)

### **8 Management system requirements**

(No additional explanation)

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## APPENDIX A

### **CALIBRATION/VERIFICATION REQUIREMENT**

This Appendix lists the calibration/verification requirement for equipment of general construction products inspection.

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<b>Type of equipment</b>	<b>Recommended maximum period between successive calibration/verification</b>	<b>Calibration/verification procedure or guidance documents and equipment requirements</b>
<b>Angle measuring device</b>	2 years	By means of appropriate reference device
<b>Caliper</b>	1 year	By means of appropriate reference device
<b>Feeler gauge</b>	2 years	By means of appropriate reference device
<b>Measuring tape</b>	2 years	By means of appropriate reference device
<b>Micrometer</b>	1 year	By means of appropriate reference device
<b>Rebound hammer</b>	1 year	By means of appropriate reference device
<b>Rule</b>	2 years	By means of appropriate reference device
<b>Set square</b>	2 years	By means of appropriate reference device
<b>Spirit level</b>	2 years	By means of appropriate reference device
<b>Straight edge</b>	2 years	By means of appropriate reference device
<b>Paint thickness gauge</b>	1 year	By means of appropriate reference device
<b>Portable hardness tester</b> (For metal and plastic)	1 year	By means of appropriate reference device
	Before use	One point check using suitable device
<b>Portable Ultrasonic device</b> (Measure thickness of inspection item)	1 year	By a 'competent calibration body' as defined in clause 6.2.I of HKIAS 003:2017
	Before use	One point check using suitable device
<b>Moisture measuring gauge</b>	1 year	Using appropriate reference device
<b>Pressure gauge</b>	1 year	By a 'competent calibration body' as defined in clause 6.2.I of HKIAS 003:2017