

HONG KONG CONCRETE INSTITUTE
PRODUCT CONFORMITY CERTIFICATION SCHEME –
REPAIR MORTAR
(PCCS-RM)

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SUPPORTED BY CONSTRUCTION INDUSTRY COUNCIL



This Scheme is developed by the Hong Kong Concrete Institute (HKCI) to provide a framework for the certification of the production and supply of repair mortar products. Producers and suppliers of repair mortar products shall also comply with all other statutory regulations and shall operate a quality management system conforming to the requirements stipulated in ISO9001 standard.

This Scheme is established in accordance with ISO 17067: 2013 with the joint effort of the Drafting Committee and Review Committee with representatives from local academics, government bodies, public organizations, industrial associations, concrete producers, certification bodies and institution for qualified auditors under the full support from the Executive Board of HKCI.

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All enquiries concerning the status, issue of amendments and interpretation of the content shall be directed to the Drafting Committee through the Secretary of the HKCI.

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Product Conformity Certification Scheme

for

Repair Mortars

(PCCS-RM)

Part One

ADMINISTRATIVE REGULATIONS

1. INTRODUCTION

- 1.1 This Scheme is established, published and owned by the Hong Kong Concrete Institute (HKCI). Validity of a Certificate of Conformity to this Scheme shall be endorsed by the HKCI verified by bearing the logo of HKCI on the Certificate. Information for all valid Certificates of Conformity including the names of certified company, certified plant and certified product(s) will be posted on HKCI's website for the reference of Purchasers. HKCI shall authorize the Certification Body to put the HKCI's logo on the Certificates of Conformity indicating the endorsement subject to an Annual Endorsement Fee payable to the HKCI. Amount of the Annual Endorsement Fee shall be announced by the HKCI from time to time.
- 1.2 This Scheme shall be read and used in conjunction with ISO17065: 2012 and ISO17067: 2013. In the event there is discrepancy between this Scheme and these two ISO Standards, the requirements in the ISO Standards shall prevail.
- 1.3 The purpose of the Scheme is to ensure that all repair mortars produced by Certified Repair Mortar Manufacturers meet the requirements in this Scheme and the Purchasers' specified requirements. This is a product certification scheme that requires Certified Repair Mortar Manufacturers to operate a quality system which complies with ISO 9001. The requirements against which the repair mortar products under this Scheme are evaluated with reference to those of the Hong Kong Housing Authority (HKHA).

- 1.4 These Administrative Regulations set out the rules for the operation of the Scheme and the rights and obligations of Certified Repair Mortar Manufacturers in relation to the Scheme.
- 1.5 This Scheme is a Type 5 product certification scheme in accordance with ISO/IEC 17067:2013 including the requirements for certification and periodic surveillance.
- 1.6 Any Certification Body who uses this Scheme for certification of repair mortar manufacturing plants shall be accredited by Hong Kong Accreditation Service (HKAS) or its Mutual Recognition Agreement (MRA) partners in accordance with this Scheme and ISO/IEC 17065:2012.
- 1.7 This Scheme can be accessed on the website of the Hong Kong Concrete Institute (HKCI).
- 1.8 This Scheme is regularly reviewed by the Drafting Committee with the support of the Review Committee including confirmation that it is fulfilling its objectives. Feedback and comments from stakeholders and interested parties can reach the Drafting Committee from time to time through the Secretary of the HKCI followed by an overall review once every 5 years.

2. GENERAL DEFINITIONS

- 2.1 For the purpose of this document, the terms and definitions given in ISO/IEC 17000:2004, ISO/IEC 17065:2012, ISO/IEC 17067:2013 and the following definitions are applied to the Regulations:

Administrative Regulations: The regulations which set out basic Administrative Requirement for the Scheme.

Applicant: A registered company who has formally applied to become a Certified Repair Mortar Manufacturer.

Areas for Improvement: Areas for improvement (AFI) are not nonconformities and corrective actions are not mandatory. However, the assessment team judges

by their experience that these are areas which may incur nonconformities if special attention is not paid or the potential problem is not resolved.

Assessment: An in-depth appraisal of an Applicant's quality management systems, production processes, testing processes and quality of repair mortars for assessing compliance with the Regulations in this Scheme. It is classified as Certification, Surveillance and Recertification assessments.

Audit Testing: Sampling and testing of repair mortars ordered by an assessment team during Certification, Surveillance and Recertification Assessments in accordance with this Scheme. All tests shall be conducted by a HOKLAS or its MRA partners accredited laboratory independent from the Applicant and the result shall be produced in a HOKLAS endorsed test report or equivalent.

Auditor: A nominee of the Certification Body appointed to carry out assessments.

Certificate of Conformity: The certificate issued by the Certification Body to confirm certification of an Applicant with respect of a particular repair mortar manufacturing plant.

Certification: Acceptance by the Certification Body, as the result of a successful assessment confirming that the Applicant's management system, operation processes and results of which comply with the Regulations in this Scheme.

Certification Body: An organization who is accredited by HKAS, or its MRA Partners to process applications from the Applicant, to conduct subsequent auditing and certification processes for the Applicant and to grant certification or otherwise to the Applicant.

Certification Mark: The logos of the HKCI and the Certification Body, that the Participants are licensed to use should be in

accordance with the Regulations and the terms and conditions given by the Hong Kong Concrete Institute and the Certification Body.

Drafting Committee: The committee under HKCI responsible for the development and maintenance of this Scheme.

Major Nonconformity: A major nonconformity is a nonfulfillment of a requirement that affects the capability of the management to achieve the intended results. Nonconformities could be classified as major in the following circumstances: (a) if there is a significant doubt that effective process control is in place, or that products or services will meet specified requirements; or (b) a number of minor nonconformities associated with the same requirement or issue could demonstrate a system failure and thus constitute a major nonconformity.

Minor Nonconformity: A minor nonconformity is a nonfulfillment that does not affect the capability of the management system to achieve the intended results.

Participant: An Applicant who has been certified to this Scheme through successful Certification Assessment and the Certification is continuously maintained.

Plant: A plant for the production of certified repair mortar product(s).

Plant Register: The register of currently certified Plants and certified repair mortar product(s) is to be maintained by the responsible Certification Body and the Hong Kong Concrete Institute.

Purchaser: An individual, firm or company who entered into a contract with a Certified Repair Mortar Manufacturer to purchase certified repair mortar(s).

Regulations: The combined Administrative Regulations and Technical Regulations.

Review Committee: A committee formed by stakeholders of this Scheme to review and give comments to the Drafting Committee for the development and maintenance of this Scheme.

Scheme: The product conformity certification scheme for the certification of the production of repair mortar products.

Technical Regulations: The regulations set out the technical requirements of the Scheme.

3. PREREQUISITES FOR PARTICIPATION

- 3.1 Any individual, firm or company engaged in the production of repair mortars shall be eligible as an Applicant to apply to become a Certified Repair Mortar Manufacturer.
- 3.2 The Applicant will be required to demonstrate the ability to comply with the Regulations and shall confirm agreement to comply with the Regulations.
- 3.3 The Applicant shall establish and maintain a documented quality system in accordance with the requirements of ISO 9001 and the Regulations of this Scheme.
- 3.4 The Applicant shall fulfill relevant statutory and regulatory requirements for the production of the repair mortars and maintain quality records for at least three months before the Certification Assessment.
- 3.5 Upon successful Certification Assessments and subsequent decision made by the Certification Board or equivalent function of the Certification Body, the Applicant shall be granted with a Certificate of Conformity to this Scheme for the repair mortars manufactured at its Plant.

4. PROCEDURES FOR APPLICATION AND CERTIFICATION

4.1 Application

4.1.1 Certification Body shall determine appropriate application procedures for a new Applicant or an existing Participants making application to the Certification Body for initial certification or an extension of the existing Certification Scope.

4.1.2 The following information shall be supplied by an Applicant to the Certification Body for certification:

- (a) Company name and address;
- (b) Name and address of the proposed manufacturing plant
- (c) Certification scope;
- (d) Company representative for communication with the Certification Body;
- (e) Other information as required by the Certification Body.

4.2 **Certification Assessment**

4.2.1 Certification Assessment shall be carried out by an Assessment Team composing of at least a Lead Auditor and one or more Technical Auditors, who shall be competent to carry out the assessment for the production of repair mortar products.

4.2.2 Certification Assessment shall comprise the following:

1. Overall assessment of the quality management system and relevant processes related to the applied certified scope to confirm the conformity of operation processes and the quality of the repair mortar product(s) to the requirements of ISO 9001 and the Regulations of this Scheme.
2. At the manufacturing Plant, the assessment team shall assess the operations of relevant processes plant and equipment including but not limited to the control of design process (where appropriate), incoming materials, production process, in-process and product quality control testing, storage as well as calibration of such plant and equipment and the operation of the relevant sections of the Certified Repair Mortar Manufacturer's quality, operational and technical systems conforming

to ISO9001 and the Regulations.

3. The assessment team will assess the quality system of the Applicant and Participants by an assessment of all relevant processes and the associated quality and production records.
 4. Evaluation of the results of production testing. The assessment team will assess the quality control system by carrying out an evaluation of quality control (QC) testing results covering a minimum of three months. The assessment team will also examine relevant quality and production records to confirm the output of quality control systems and hence authenticate the conformity of the repair mortar to the specified criteria in the Regulations.
 5. Audit testing. The Assessment Team shall take at least three packages of spot samples at the production point or storage of repair mortars from the Plant and/or depots supplied with repair mortars by the Plant. The samples taken shall then be sealed by signature of a member in the Assessment Team or other acceptable means and clearly labeled. One sample shall be taken for certification audit testing conducted by an HOKLAS or its MRA partners accredited laboratory in accordance with Section 6.1.3 of the Technical Regulations in this Scheme. Another two samples shall be retained by the Applicant. The audit testing is considered to be passed if the results of all assigned tests meet the requirements stated of this Scheme. In the event any of the test results of the first sample fails to meet the requirement(s) stated in this Scheme, all the two retained samples shall be sent to an HOKLAS or its MRA partners accredited laboratory for re-testing of the failed performance parameter(s). The audit testing is considered to be passed only when results if the re-tests for both the two samples meet the requirement(s) stated in this Scheme. Re-sampling is required by the Assessment Team if any of the samples is lost, deteriorates or becomes contaminated when taken for test(s).
- 4.2.3. On completion of the Certification Assessment, the Assessment Team will report the findings, if any, and recommendation for Certification or a decline of such with or without condition in an audit report for the acknowledgement of the Applicant based on the audit result.

4.2.4 There are three possible recommendations:

1. **No Nonconformity** Certification will be recommended, subject to full compliance of the Initial type testing results to the requirements in this Scheme, to the decision of the certification body.
2. **A number of minor nonconformities** which do not cumulatively indicate a major failure of the quality management system and product quality. Certification will be recommended after submission of a letter by the Applicant to the Assessment Team giving satisfactory details of corrections and corrective actions which, to the opinion of the Assessment Team, will remove the nonconformities from the system after successful implementation. The time limit for the submission of the letter is two weeks.

Note that implementation of corrections and corrective actions do not have to be completed before the receipt of the letter by the Certification Body. Corrections and corrective actions shall be implemented and completed within a maximum of four weeks or such lesser time as accepted by the Assessment Team. Implementation results of Minor nonconformities will be audited at the first subsequent Surveillance Assessment.

3. **A major nonconformity or a number of systematic minor nonconformities** which accumulate to indicate a major failure of the quality management system or product quality, which, to the opinion of the Assessment Team, cannot be rectified within a reasonably short period of time. The Applicant will then be required to propose corrections and corrective actions for the agreement by the Assessment Team to rectify the nonconformities in the system. The time limit for the submission of the written proposal will be two weeks.

Corrections and corrective actions agreed by the Assessment Team shall be implemented within an acceptable time which will usually be between one to three months.

Certification will not be recommended until a follow up assessment is

carried out by the Assessment Team confirming that the nonconformities have been rectified after successful implementation of the corrections and corrective actions.

If the nonconformities cannot be rectified within six months after the certification audit, the Applicant shall restart a new application.

4.3 Certification

4.3.1 Recommendation for Certification from the Assessment Team shall be passed to the Certification Body for the decision of granting the Certification, or otherwise, to the Applicant.

4.3.2. The Certification Board shall issue a Certification of Conformity to the successful Applicant with the following content:

- a. Certificate number
- b. Name and address of the Certification Body
- c. Name and address of the Participant and the Manufacturing Plant
- d. Name, model number and mortar class of the certified repair mortar
- e. Statement that the repair mortar conforms to the requirements of relevant grade(s) of the Product(s) to this Scheme, for which the year of publication shall be clearly stated
- f. Certification Scope

4.3.3 Where an application for participation in this Scheme is rejected or Certification is refused, the Applicant shall have the right of representation to an appeal committee in accordance with the Certification Body regulations.

4.4 Use of License, certificates and marks of conformity

4.4.1 The ownership, use and display of licenses, certificates, marks of conformity, and any other mechanisms for indicating the certification of repair mortar products shall be in accordance with the requirements in ISO/IEC 17030 and the regulations of the Accreditation Body and Certification Body.

4.4.2 A license agreement issued by the HKCI for controlling the use of

certificates, marks or other statements of conformity of the certified repair mortar products shall be signed by the Participants through the Certification Body.

- 4.4.3 The way in which the Participants make reference to this Scheme in their publicity material shall be subject to the rules set out by the Certification Body and the HKCI from time to time.

5. OBLIGATIONS OF PARTICIPANTS OF THIS SCHEME

- 5.1 The Participants shall keep the Certification Body informed in writing of changes in his circumstances which may affect Certification. Such changes include:

- (1) Changes in ownership or name of the company for Certification.
- (2) Change of processes which may affect the certification scope.
- (3) Change of the location of the Plant and/or Quality System Management Office.
- (4) Closure of manufacturing Plant.

6. SURVEILLANCE ASSESSMENT AND RECERTIFICATION ASSESSMENT

- 6.1 After Certification, the assessment team will conduct periodic Surveillance Assessments for the Certified Scope of the Participants.

6.2 Frequency and Purpose of Surveillance Assessment

- 6.2.1 The frequency of Surveillance Assessments for a new Participant in the first three-year Certification, irrespective of any updating of this Scheme, shall be once in every nine months.

- 6.2.2 The frequency of routine Surveillance Assessments after the first Re-certification shall be once in every twelve months.

- 6.2.3 Surveillance Assessments shall comprise the followings:

- (1) Overall assessment of the quality management system;
- (2) Production processes for Certified Repair Mortar Manufacturer;
- (3) Evaluation of the results of production testing to confirm conformity of the repair mortars and evaluate the results of all quality control tests since the previous assessment;

(4) Audit testing.

6.2.4 The Assessment Team shall take three packages of spot samples at the production point or storage of repair mortars from the Plant and/or depots supplied with repair mortars by the Plant. The samples taken shall then be sealed by signature of a member of the Assessment Team or other acceptance means and clearly labeled. One sample shall be taken for certification audit testing conducted by an HOKLAS or its MRA partners accredited laboratory in accordance with Section 6.1.3 of the Technical Regulations in this Scheme. Another two samples shall be retained by the Applicant. The audit testing is considered to be passed if the results of all assigned tests meet the requirements stated of this Scheme. In the event any of the test results of the first sample fails to meet the requirement(s) stated in this Scheme, all the two retained samples shall be sent to an HOKLAS or its MRA partners accredited laboratory for re-testing of the failed performance parameter(s). The audit testing is considered to be passed only when results if the re-tests for both the two samples meet the requirement(s) stated in this Scheme. Re-sampling is required by the Assessment Team if any of the samples is lost, deteriorates or becomes contaminated when taken for test(s).

6.3 **Conclusions from Surveillance Assessment**

6.3.1 On completion of each Surveillance Assessment, the Assessment Team shall report findings, including but not limited to Area for Improvements, Minor and Major Non-conformities, to the Participants for acknowledgement and follow up action(s). The surveillance assessment team will indicate orally with a written recommendation for continuing the Certification or otherwise.

6.3.2 There are three possible recommendations:

- (1) Certification is confirmed. The operation processes in the Certified Scope and the product quality comply with the Regulations in this Scheme without finding of any nonconformity. Some AFIs may be given for the improvement of the quality and operation processes.

- (2) Certification is conditionally confirmed. There are one or more than one minor nonconformities, which, to the opinion of the Assessment Team, do not cumulatively indicate a major failure of the quality management system and product quality. Certification of the Participant is recommended to be confirmed upon receipt of the proposed corrections and corrective actions with proposed completion time by the Assessment Team from the Participant and based on which, the Assessment Team accepts that the nonconformities found will be rectified and cleared after successful implementation of the proposed correction(s) and corrective action(s). The time limit for the receipt of the proposed correction(s) and corrective action(s) will be two weeks. The proposed completion time of the correction(s) and corrective action(s) shall be a maximum of four weeks unless otherwise accepted by the Assessment Team based on the nature of the nonconformities and practicality concern.
- (3) Suspension of Certification or Reduction of Certification Scope is recommended. A **major nonconformity** or a **number of systematic minor nonconformities** exist which accumulate to indicate a major failure of the quality management system or product quality. The Participant will be required to submit a written proposal for correction(s) and corrective action(s) within two weeks to the Assessment Team for consideration. The Assessment Team shall assess the corrections and corrective actions for acceptance that the nonconformities found will be rectified and cleared after successful implementation of the proposed correction(s) and corrective action(s). A partial or full re-assessment, as directed by the Assessment Team, will be required after notification from the Applicant that the accepted correction(s) and corrective action(s) have been implemented. Recommendation for continuation of Certification shall only be made by the Assessment Team providing, to the opinion of the Assessment Team, the nonconformity has been cleared and reoccurrence of similar nonconformity has been prevented by effectively implementation of the correction(s) and corrective action(s). If, to the opinion of the Assessment Team, the major nonconformity cannot be effectively cleared or reoccurrence of

similar nonconformity cannot be prevented within three months after the major nonconformity is identified, Certification of the Participant shall be withdrawn or the Certification Scope shall be reduced, whichever the Assessment Team considers appropriate, and re-application for a new Certification or resumption of the original certification scope shall be required.

6.4 Recertification Assessment

6.4.1 The duration of a Certification is three years. Recertification Assessment shall be carried out at the third year after Certification within three months of the expiry date of the Certification. Recertification Assessment shall be carried out in the same way as an initial Certification Assessment.

7. SUSPENSION, CHANGE OF SCOPE AND WITHDRAWAL OF CERTIFICATION

- 7.1 Pursuant to the condition stated in Clause 6.3.2 (3) of this Regulation, the Certification Body will determine whether the Certification for the Participant is suspended or withdrawn.
- 7.2 Other than the condition stated in Clause 6.3.2 (3) of this Regulation, if the Participant, to the opinion of the Certification Body, fails to comply with the Participant's obligations under this Scheme, the Certification Body will suspend the Certification of the Participant. If the failing of complying with the Participant's obligation under this Scheme continues for more than three months, the Certification Body may decide to withdraw the Certification of the Participant and re-application for a new Certification shall be required.
- 7.3 Upon a suspension of the Certification of a Participant, the Certification Body shall serve a written notice to the Participant for such suspension with detail reason of the suspension.
- 7.4 Upon the decision to withdraw the Certification, the Participant shall serve a written notice to the Certification Body at least one calendar month before the production of the certified repair mortars to the Purchasers are ceased.
- 7.5 If the Certification for a Participant is suspended or withdrawn, the Participant

shall immediately cease to use the Certification Mark and shall within two weeks' time inform the Purchaser(s) for such suspension or withdrawal of the Certification. All kinds of advertisement regarding the Certification shall be ceased and all certification documents shall be returned to the Certification Body by the Participants. Other actions required if the certification is suspended, withdrawn or terminated shall be subject to the rules of the Certification Body and shall be stated in the contract with the Participants.

8. INFORMATION ON CERTIFIED REPAIR MORTAR MANUFACTURERS

8.1 Upon the request of any Purchasers, end users or any stakeholder of the certified repair mortars, the Certification Body is obliged to provide verbal or written confirmation, whichever is requested, of the status of any Certified Repair Mortar Manufacturer under his registry.

8.2 Reasons for any suspension or withdrawal of Certification shall be stated in the Register as mentioned in Clause 7.3.

9. APPEALS AGAINST DECISIONS

9.1 The Applicant or Participant shall have the right to appeal against any decisions of the Assessment Team or the Certification Body. An appeal committee shall be set up under the Certification Body. Details of the appeal procedure shall be provided in the Certification Body regulations and make known to all Applicant and Participant.

10. CHANGES TO REGULATIONS

10.1 In the event of a change in the Regulations of this Scheme or the regulation of the Certification Body, a grace period of six months, or any other length of the grace period to be announced by the HKCI, shall be given to all Participants for clarification of the new requirements and preparation works for conforming to the changed requirements.

10.2 In the event of a change in this Scheme, the grace period given to the Participants shall be subject to the announcement of the relevant committee(s) of the HKCI. The Certification Bodies and Participants shall make all necessary

amendments in their auditing and operation systems and product quality to comply with the new requirements in the Scheme accordingly within the grace period given.

11. COMPLAINTS

11.1 Certified Repair Mortar Manufacturers shall keep records of all written complaints received from any concerned parties and corresponding responses. These records shall be made available to the Assessment Team at the time of any Assessment. The Assessment Team shall investigate in detail on such complaints to see if any Area for Improvement or non-conformity has to be raised.

11.2 The Certification Body shall keep a record of all written complaints, in relation to a Certified Repair Mortar Manufacturer received from any concerned parties. Such complaints shall be investigated at the discretion of Certification Body and reported to the Certification Board or equivalent.

11.3 The Certification Body shall respond to complainants with a report which is confined to a statement upon the Certification status of the Certified Repair Mortar Manufacturer and its Plants.

12. CONFIDENTIALITY

12.1 All Applicants and Participants shall disclose to the Assessment Team for the purposes of Assessments all information or records obtained from or pertaining to Purchasers and connected with the Scheme.

12.2 The Assessment Team and any other staff in the Certification Body shall not disclose information or records obtained from the Applicants and Participants unless otherwise permitted by the Applicant or Participant concerned.

13. EXPERIENCE AND QUALIFICATION OF LEAD AUDITORS AND TECHNICAL AUDITORS

13.1 Lead Auditors who are eligible for auditing PCCS-RM quality management system shall have the following registration: - Registered IPC (International Personnel Certification Association) or Hong Kong Institution of Certified

Auditors (HKICA) Lead Auditor in Quality Management System and Product Certification Auditor, or equivalent.

13.2 Technical Auditors who are eligible for auditing PCCS-RM technical management system shall have the following training, experience and qualifications:

- (a) A relevant Higher Diploma in architectural studies, building, materials science, structural or civil engineering, or other related fields plus a minimum of two years' technical experience in the industry of production of repair mortars, ready mixed concrete, precast concrete or any other related field, or;
- (b) Other qualifications and experience, which are acceptable to the Accreditation Body, HKAS or its MRA Partners.

14. PUBLICATION OF DIRECTORY OF CERTIFIED PRODUCTS

14.1 The HKCI shall not be responsible to publish a directory of certified products to this Scheme.

14.2 The Certification Body shall be responsible to publish and maintain a list of certified products under its certification to this Scheme with the updated certification status and all the contents in the Certificate of Conformity for each certified product.

15. CONTRACTS AMONG HONG KONG CONCRETE INSTITUTE, CERTIFICATION BODY, APPLICANTS AND PARTICIPANTS

15.1 The Certification Body shall enter into an agreement with the Hong Kong Concrete Institute for the mutual responsibilities and chargeable annual fee for the endorsement of the HKCI for the validity of the Certificates of Conformity issued by the Certification Body.

15.2 Hong Kong Concrete Institute shall not be liable for the performance, behaviour or any misconduct of the Certification Body, the Applicants and the Participants.

15.3 The Scheme owner is obliged to answer enquiries regarding this Scheme from stakeholders of this Scheme.

15.4 The need for and the content of the contracts between the Certification Body, the Applicants and the Participants shall be determined by the Certification Body.

TECHNICAL REGULATIONS

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Product Conformity Certification Scheme

for

Repair Mortars

(PCCS-RM)

Part Two

TECHNICAL REGULATIONS

1. INTRODUCTION

- 1.1 These Technical Regulations set out the technical requirements of the Scheme.
- 1.2 The Technical Regulations shall be read in conjunction with the Administrative Regulations.

2. QUALITY SYSTEM

- 2.1 An effective quality system shall be established, documented and maintained in accordance with the prevailing ISO 9001 standard and relevant requirements in the Regulations of this Scheme by the Certified Repair Mortar Manufacturer.

3. RESPONSIBILITIES OF CERTIFIED REPAIR MORTAR MANUFACTURER

- 3.1 The Certified Repair Mortar Manufacturer shall take responsibility for the quality of repair mortar, and shall nominate a Quality Management Representative who shall have defined authority and commitment to maintain their quality management system fully comply with the requirements of ISO 9001 and to produce repair mortar products fully comply with the Technical Regulations of this Scheme.
- 3.2 The Certified Repair Mortar manufacturer shall ensure the resources required for

the operation of this Scheme, including impartiality and competence of the personnel (internal and external) for the functions they perform and are aware of the effects of these functions on quality. A proper training procedure shall be set up and maintained for the training of technical staff.

3.3 All evaluation resources shall be calibrated and properly maintained internally or externally. External calibration authorities shall be accredited, wherever available, by HOKLAS or its MRA partners.

3.4 All staff of the Certified Repair Mortar Manufacturer shall be assessed for their competence and shall be ensured to strictly follow the requirements of the quality management system of the Certified Repair Mortar Manufacturer, and the requirements of this Scheme.

4. DEFINITIONS

Definitions for terms used in this Scheme shall be referred to the Administrative Regulations of this Scheme and those given in ISO17065: 2012 and ISO17067: 2013, wherever appropriate.

5. REQUIREMENTS OF REPAIR MORTAR

Requirements of repair mortar products are given in Table 5.1 of this Scheme forming the compliance criteria for assessment of repair mortar products for Certification under this Scheme (for details of tests, please see Annex A).

Table 5.1: Characteristics of Repair Mortar

Test Code	Characteristics (test methods shall be referred in Annex A of the Technical Regulations in this Scheme)	Mortar Class		
		40	25	S (Note 1)
TM1	Rang of compressive strength at 28 days (MPa)	30 – 60	20 – 40	$\geq f_{cu} + 7$ (Note 2)
TM2	Minimum tensile strength at 7 days (MPa)	2.0	1.5	--
TM3	Range of modulus of elasticity at 28 days (GPa)	15 – 25	9 – 15	--
TM4	Minimum bond strength at 7 days (MPa)	2.0	1.5	--
TM5	Cracking in Coutinho Ring test at 28 days	No crack	No crack	--
TM6	Minimum fig air permeability (seconds)	200	150	--
Note 1	Class S mortars are cementitious based repair mortar products used for repairing concrete defects such as honeycombs.			
Note 2	f_{cu} is the characteristic strength of parent concrete (e.g. 35 MPa, 40 MPa, 45 MPa, 60 MPa, etc.)			

6. INITIAL TYPE TESTING, PRODUCTION CONTROL TESTING & AUDIT TESTING

6.1 General Requirements

The Certified Repair Mortar Manufacturer shall implement a documented Scheme for the evaluation of conformity that includes the following testing:

- (a) Initial Type Testing
- (b) Production Control Testing
- (c) Audit Testing

6.1.1 Initial Type Testing

Initial Type Testing shall be carried out in accordance with the requirements given in the Scheme to confirm initial compliance of the characteristic requirements with respect to the declared class of the repair mortar product and any other stated customer requirements.

Initial type testing shall also be carried out on existing repair mortar products after any change in raw materials or manufacturing procedures that can modify the declared values of the characteristics or application properties. In these cases, the appropriate initial type testing to be carried out are those, to the opinion of the Certified Repair Mortar Manufacturer based on sound technical projection and are agreeable to the Certification Assessment Team, for the characteristics and properties that can be affected and need confirmation; any new property or properties arising from the change of formulation or manufacturing procedure shall be tested and the results reported.

6.1.2 Production Control Testing

Repair Mortar Manufacturer shall conduct routine production control testing in accordance with the production control frequencies given in Table 6.1 to ensure continuous compliance of the characteristic requirements with respect to the declared class of the repair mortar products.

6.1.3 Audit Testing

Audit testing shall be carried out during Certification Assessment, Surveillance and Re-certification Assessments for the Certified Repair Mortar Manufacturer in

accordance with Table 6.1.

6.2 Plant Production Control

Plant Production Control Procedures shall be established conforming to the requirements in ISO9001 shall be established to cover but not limited to:

- (i) inspection and testing, where appropriate, of raw materials;
- (ii) calibration and routine maintenance of measuring and monitoring equipment;
- (iii) inspection and testing of finished products;
- (iv) identification and traceability from incoming raw materials to finished products;
- (v) statistics and monitoring of trends for inspection and testing results.

6.3 Testing Laboratories

All tests for Initial Type Testing shall be conducted by laboratories accredited by HOKLAS or its MRA partners for the test concerned. Tests for Production Control Testing can be conducted by in-house laboratory of the Certified Repair Mortar Manufacturer. If the Production Control Testing is to be conducted externally, the external laboratories shall be accredited by HOKLAS or its MRA partners. Audit Testing shall be conducted in accordance with Table 6.1.

Table 6.1: Test Items and Frequencies

Test	Initial Type Testing	Production Control Testing	Audit Testing	
			Surveillance	Certification & Recertification
Compressive Strength Test at 28 days (TM1)	All tests	All tests within 1 year or for every 1000 tons of production, whichever is more frequent	Two tests to be selected by the Audit Team	All tests
Tensile Strength Test at 7 days (TM2)				
Modulus of Elasticity Test at 28 days (TM3)				
Bond Strength Test at 7 days (TM4)				
Shrinkage Cracking Test at 28 days (TM5)				
Air Permeability Test (TM6)				

7. REVIEW OF QUALITY MANAGEMENT SYSTEM

7.1 The quality management system established in accordance with these Regulations shall be systematically reviewed at least once every twelve months to ensure the continuing effectiveness of the system.

8. PRODUCTION CONTROL AND TESTING EQUIPMENT

8.1 Plant Production Control

Control procedures for initial type test, in-process control and product control tests shall be established relevant to the declared properties.

Any change in raw materials, manufacturing procedures or control plan that can affect the properties of the product shall be recorded. Conformity of products after such changes shall also be evaluated.

The control procedures shall consist of a system for the production quality assurance to ensure that the product complies with the relevant requirements.

The product control shall consist of the following main phases:

- (a) inspection and testing of raw materials,
- (b) inspection and testing of production equipment and process,
- (c) inspection and testing on finished products.

8.1.1 Raw Materials

The Certified Repair Mortar Manufacturer shall define the acceptance criteria and control procedures for incoming materials to ensure that these are not used until it has been verified that they comply with the required specifications. The results of these tests shall be recorded and be available for inspection Audit Testing.

8.1.2 Production Process

The Certified Repair Mortar Manufacturer shall identify and define the plant and production processes and ensure that the processes are carried out under controlled conditions clearly described in procedures. The processes are verified by means of inspections and testing documented in procedures, as

frequency and values or criteria required both on equipment and on operations in the process. The actions to be taken when control values or criteria are not obtained shall be given. Inspections and maintenance of equipment shall be carried out and recorded in accordance with the manufacturer's written procedures.

8.1.3 Finished Products

The number and size of the samples, frequency of sampling, tests to be performed and the results obtained shall be recorded. The tests shall be conducted at least with the frequency specified in Table 6.1. For the purposes of plant production control, alternative tests to those given in Table 6.1 may be used, provided that a correlation of the results between both tests, for the product in question, is established. The use of alternative tests shall be recorded, maintained and be made available on request from auditors, clients or other relevant parties.

8.1.4 Statistical Techniques

Where and when possible and applicable, the results of inspections and testing shall be interpreted by means of statistical techniques, by attributes or by variables, to verify the product characteristics and to determine if the production complies with the compliance criteria and the product complies with the declared values in particular when there is a significant number of results.

9. MARKING AND LABELLING

9.1 General Requirements

Products complying with the Regulations of the PCCS-RM Scheme shall be clearly marked with, but not limited to, the following information.

- (a) Name of product;
- (b) Classification of the repair mortar product;
- (c) Brand and place of origin;
- (d) Instruction for use or method statement;
- (e) Water addition rate or mix proportion, if any;
- (f) date or batch code of production (for packaging material only), shelf life and conditions of storage.

The information shall be marked on the packaging and/or the product's technical data sheet.

ANNEX A

Testing for characteristics of Repair Mortar Products:

(a) Compressive strength (TM1)

The compressive strength of the repair mortar specimens shall be determined in accordance with BS6319: Part 2: 1983 except that the cube size shall be 70.7 mm. Curing shall be carried out at a temperature of $27\pm 2^{\circ}\text{C}$ and at a relative humidity of $55\% \pm 5$. Specimens shall be left in moulds and covered with polythene for 3 days. They shall then be uncovered, demoulded and stored as above until required for testing.

(b) Tensile strength (TM2)

The tensile strength of the repair mortar specimens shall be determined in accordance with BS6319: Part 7: 1985. Curing shall be carried out at a temperature of $27\pm 2^{\circ}\text{C}$ and at a relative humidity of $55\% \pm 5$. Specimens shall be left in moulds and covered with polythene for 3 days. They shall then be uncovered, demoulded and stored as above until required for testing.

(c) Modulus of Elasticity (TM3)

The modulus of elasticity in compression of repair mortar specimens shall be determined in accordance with BS6319: Part 6: 1984. Curing shall be carried out at a temperature of $27\pm 2^{\circ}\text{C}$ and at a relative humidity of $55\% \pm 5$. Specimens shall be left in moulds and covered with polythene for 3 days. They shall then be uncovered, demoulded and stored as above until required for testing.

(d) Bond Strength (TM4)

The bond strength of the repair mortar shall be determined using a modified tensile strength test method to BS6319: Part 7: 1985 described below. A high strength mortar briquette specimen shall be made and cured for 28 days. The mortar shall have a tensile strength in excess of 4 MPa when tested at 28 days to BS6319: Part 7: 1985. One half of the broken briquette shall be returned to the mould, primed with the appropriate bond coat and the remaining section of the mould shall be filled with the repair mortar under test. The repaired briquette shall be cured at a temperature of $27\pm 2^{\circ}\text{C}$ and at a relative humidity of $55\% \pm 5$ and then tested as described in BS6319: Part 7: 1985. The failure mode and bond strength shall be recorded.

(e) Shrinkage Cracking (TM5)

Shrinkage cracking of repair mortar shall be tested by the Coutinho Ring test as described below. The mould for this test shall be formed from steel to provide an annular specimen with an inner diameter of 115 ± 0.1 mm, an outer diameter of 175 ± 0.1 mm and a depth of 50 ± 0.1 mm. Mould oil shall be applied to ease demoulding. The mixed repair mortar shall be compacted within the mould. The compacted specimen together with the mould shall be kept at a temperature of $27\pm 2^\circ\text{C}$ and at a relative humidity of $55\%\pm 5\%$ throughout the test unless otherwise specified. Record mass of specimen when demoulded. After casting the specimen, it is protected in order to prevent any change of humidity with the outside environment. After 24 hours, the specimen is returned with the outer mould ring and base plate removed and the inner ring still in place to the conditioning environment. The repair mortar specimen shall be monitored daily for cracking until day 7 and then at day 14, 21 & 28, and the number and width of the cracks of the specimens recorded. Record mass of the specimen when cracking first occurs.

(f) Permeability (TM6)

The permeability of the repair mortar product shall be determined by the modified Figg test described in "Improvements to the Figg method for determining the air permeability of concrete", Cather, Figg, Marsden and O'Brien. Mag. Conc. Res 36 No. 129 Dec. 1984. The test shall be carried out on $100 \times 100 \times 100$ mm cube specimens cured in the mould covered in polythene at a temperature of $27\pm 2^\circ\text{C}$ and at a relative humidity of $55\%\pm 5\%$. After three days, the specimens shall be demoulded and be kept under the same environment for a further 18 days. The specimens shall be dried in an oven for 14 days at 50°C prior to testing for permeability.

The leakage of the apparatus shall be determined before and after the test using the method described in the above reference. If the leakage exceeds 0.01 kPa/sec, test results shall be discarded and the specimens shall be re-tested after the apparatus is repaired.

Disclaimer:

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