



ACCREDITATION SCHEME FOR
CERTIFICATION BODIES

CT 30
SAC CRITERIA FOR SPECIALIST
BUILDERS (PRECAST CONCRETE
PRODUCTS)

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1. INTRODUCTION

- 1.1 This assessment schedule relates to the quality system requirements to produce structural precast concrete products at the precast factory production yard in accordance with the relevant product standard and execution specification.
- 1.2 The certification of conformity by a certification body, will enable the applicant's new registration or renewal of Specialist Builder License under the precast concrete product manufacturer.

2. SCOPE

- 2.1 This Schedule describes the minimum quality and operations requirements to produce precast concrete products. It relates to the use of the followings:
- a. Precast concrete products manufactured to BS EN 13369:2018
 - b. Concrete to SS EN 206:2014 and SS 544: Part 1 & 2:2019
 - c. Steel Reinforcement bars to EN 10080 or SS560 & SS561
 - d. Prestressing steel to prEN 10138:2000 or BS5896:2012 or ASTM A416
 - e. The organizational and procedural requirements of BS EN ISO 9001:2015
 - f. BS EN 13670-2009 Execution of Concrete Structures
 - g. Any requirements as detailed in Building and Construction Authority (BCA) Approved Document

2.2 Schedule of Operations

- 2.2.1 The Specialist Builder (SB) shall document the manufacturing processes, materials and relevant equipment used in the production of the product(s) as detailed in the scope of the application / approval, the names and grades of operational personnel relevant to this schedule in the Schedule of Operations as prepared by the Certification body (CB).
- 2.2.2 The Schedule of Operations shall be maintained in an updated form and used by the CB in the assessment and, where appropriate, subsequent surveillance inspections.

3. DEFINITIONS

Client: The body for which the works are being carried out.

Customer: The body engaging the organization to carry out the work described in the specification according to this schedule (this would usually be the main contractor).

Execution specification: The documents covering all drawings, technical data and requirements necessary for the execution of a project.

Method Statement: The document setting out the specific details, resources and sequence of activities relevant to the production of precast concrete products.

Nominated Supplier: A body engaged by the Customer or Client for the provision of specific materials, equipment or services.

Organization: The SB responsible to produce precast concrete products in accordance with this schedule.

Outsourced Operation: An operation deemed to be an integral part of the manufacturing process which is provided by an external provider

Quality plan: The document setting out the specific quality practices, procedures, resources and sequence of activities relevant to the project.

Supplier: A body approved by the organization for the provision of specified materials, equipment or services.

Nominated Supplier: A body engaged by the Customer or Client for the provision of specific materials, equipment or services.

4. OPERATION OF THE SCHEME

The Scheme will operate as follows:

4.1. Certification of the Organization

4.1.1 Certification of the organization will be granted after a satisfactory assessment of all office and factory operations relevant to the factory production of precast concrete products activities by CB in accordance with all parts of this Schedule, the organization's quality plan, method statement, execution specification and BS EN ISO 9001.

4.2. Notification of Contracts

4.2.1 The organization shall notify CB half yearly of all newly awarded precast contracts relevant to the scope of approval. In addition, the total supply contract value and general product type & quantity shall also be detailed. Assessments and surveillance inspections shall be carried out as necessary by the CB at the factory to ensure satisfactory operational control against this schedule.

4.2.2 Failure to provide this information will result in a minor NCR being issued. Further failures will result in the issue of a major NCR.

5. QUALITY MANAGEMENT SYSTEM REQUIREMENTS

5.1 The organization shall operate a quality management system that complies with ISO 9001:2015 and this schedule. This Schedule interprets those elements that are particularly relevant to the production of precast concrete products to ensure consistent product quality and continued compliance with this schedule.

5.2 Documentation Requirements, Control of Records

5.2.1 The organization shall establish and maintain records to show conformity with this schedule and shall define their retention method and their disposition. Records shall be kept for a minimum of 5 years or as defined by any particular project or client.

5.2.2 Records relating to the technical details of precast concrete products shall be retained for a minimum period of 5 years and a copy of these shall, when required, be sent to the client.

5.3 Management Responsibility

5.3.1 Top management shall provide evidence of its commitment to the development and implementation of the quality management system and continually improving its effectiveness by:

- a) Communicating to the organization the importance of meeting customer as well as statutory and regulatory requirements.
- b) Establishing the quality policy.
- c) Ensuring that quality objectives and that of specifically selected projects are established
- d) Conducting management reviews.
- e) Ensuring the availability of resources.

5.4 Quality Management System Planning

5.4.1 The organization shall produce a quality plan for each factory production as appropriate and identifying specific details on which it is contracted to operate. The plan shall include method statements for the relevant production sequence and quality control and shall also include special product quality requirement and any critical outsourced operations. The minimum scope for a quality plan is given in Section 8.

5.4.2 The quality plan shall identify the: human resources, responsibilities, hold points (and release authorities), processes, materials, equipment, controls, inspection, measuring and test equipment, reference standards and levels of acceptability required to meet the contract requirements.

5.4.3 If an outsourced operation is used, the Quality plan shall detail the methods of control employed by the SB to ensure compliant material or services are provided.

5.5 Provision of Resources

5.5.1 The organization shall identify the resource requirements in the quality plan and provide adequate resources, including space, labor, materials, equipment, inspection, measuring and test equipment and trained personnel for the management, supervision and performance of the work and verification activities.

5.5.2 The organization shall have a documented procedure which details the attendance required to produce precast concrete products. The provision of attendance shall be agreed between the customer and the organization.

5.6 Competence, Awareness and Training

5.6.1 The organization shall:

- a) Determine the necessary competence for personnel performing work affecting product quality, including inspection and verification activities.
- b) Provide training or take other actions to satisfy these needs.
- c) Provide guidance in process problem resolution and adequate supervision.
- d) Periodically evaluate the effectiveness of the actions taken, and where required certify the trained individuals.
- e) Ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives.
- f) Maintain appropriate records of education, training, skills and experience.

5.6.2 The organization shall ensure that all operatives are familiar with the operation of the production of precast concrete products. All operations shall be carried out by operatives with appropriate knowledge, training and proven experience in carrying out similar operations.

5.7 Purchasing

5.7.1 The organization shall have a documented procedure for purchasing materials and services from suppliers.

5.7.2 All materials and services shall be purchased from sources approved by the organization.

5.7.3 Purchasing Information

The purchase orders shall include all aspects of the material or service specification, which are important in ensuring satisfactory product quality, traceability and identification.

5.7.4 Evaluation of Suppliers

The organization shall have a documented procedure for the evaluation and selection of suppliers. Records of acceptable suppliers shall be maintained. The assessment shall account for all aspects of the service or material specification, which are important in ensuring satisfactory quality and identification of the material or service.

Procedures shall also be included for control of outsourced operations which are integral for the continued supply of compliant product.

5.8 Product Identification and Traceability

5.8.1 The organization shall have documented procedures that ensure product identification and traceability during all stages of production, delivery, receipt and installation into the structure.

5.9 Determination of Requirements Relating to the Product

5.9.1 The organization shall ensure that all contract responsibilities and relevant design details and attendance are clearly, adequately and unambiguously defined.

5.9.2 The organization shall review the requirements related to the product. This review shall be conducted prior to the organization's commitment to supply a product to the customer and shall ensure that:

- a. Product meets the requirements in this document.
- b. The internal and external audit reporting requirements.
- c. Contract or order requirements differing from those previously expressed are resolved.
- d. The organization has the ability to meet the defined requirements.

5.9.3 Records of the results of the review and actions arising from the review shall be maintained.

5.9.4 For new product, the organization shall ensure that it has the capability in obtaining the necessary technical knowhow and ability to establish the necessary resources, with readiness to proceed with the new product production.

6. PRODUCTION AND SERVICE PROVISION

6.1 Requirements

6.1.1 Material requirements

The material requirements shall comply to BS EN 13369:2018, Clause 4.1.

6.1.2 Production requirements

The production requirements shall comply to BS EN 13369:2018, Clause 4.2.

6.1.3 Finished product requirements

The finished product requirements shall comply to BS EN 13369:2018, Clause 4.3.

6.2 Receipt

6.2.1 The organization shall have a documented procedure for the receipt of incoming material that includes inspection of material and, where appropriate, correlation of advice notes and test certificates. Inspection needs to include condition of the materials, quantities, specification and ensuring that heat/batch numbers match delivery documentation/certification.

6.2.2 The procedure shall incorporate the receipt of customer property.

6.3 Storage

6.3.1 Storage may be off site or on site but in each case the organization shall have a prescribed procedure, which ensures that materials are stored and segregated in a manner, which prevents their damage, deterioration and contamination.

6.3.2 Corrosion of lifting attachments on the precast product shall be prevented. For clarification, unacceptable corrosion is regarded as that which cannot easily be removed by hand and permanently marks the surface of the part (such as surface pitting).

- a. Where applicable, the organization shall have a documented procedure for recording and identifying all materials held in stock and subsequently processed. The procedure shall ensure materials are identified to the original batch information, as applicable. This system shall include any material supplied nominated suppliers engaged by the customer or client.
- b. All test and inspection information shall be maintained as specified in the appropriate standard. Material shall not be released from storage until verification of conformity to specified requirements has been received.
- c. The procedure shall include all material sent to site and subsequently installed.

6.4 Handling

- 6.4.1 The organization shall have a documented procedure for handling materials and equipment that prevents them from becoming damaged, contaminated or corroded.

6.5 Delivery

- 6.5.1 The organization shall ensure that products are protected up to delivery to site.

6.6 Control of Monitoring and Measuring Devices

- 6.6.1 The organization shall have a documented procedure which ensures that all equipment that is used for processing, measuring and testing is identified, defined and regularly calibrated and maintained in accordance with a prescribed calibration and maintenance programme. The calibration and maintenance programme shall include any contract-specific requirements.

6.7 Internal and External Audits

- 6.7.1 The organization shall have a documented procedure for the planning, implementing and objective reporting of internal and external quality audits in order to verify the effectiveness of the quality system, including off-site activities. The level of inspection shall comply with BS EN13670 inspection class 3.
- 6.7.2 The internal audit shall include both the Quality Management System (QMS) and activities / processes and:
- a. Verify that quality activities comply with requirements specified in the organization's quality management system.
 - b. Determine the effectiveness of the quality management system.
- 6.7.3 Results of external audits carried out on critical suppliers or outsourced operations shall also be recorded.
- 6.7.4 The results of both internal and external audits shall be recorded and shall include:
- a. Objective evidence of audit findings.
 - b. Recommendations for corrective actions.
 - c. Verification of corrective actions.
- 6.7.5 The results of internal and external audits shall be included in the management review and shall be made available to the client where required by the execution specification.

6.8 Monitoring and Measuring of Processes and Product

6.8.1 The organization shall have a documented procedure that ensures inspection and testing is conducted in accordance with the quality plan, appropriate reference standards and execution specifications, including any project specific quality requirement.

6.8.2 Records of inspection and test information shall be maintained as specified by the customer and the appropriate standard or specification.

6.9 Control of Nonconforming Product

6.9.1 The organization shall have a documented procedure for processing nonconforming work and materials, which shall include:

- a) Adequate product segregation and identification of nonconforming product.
- b) Review of nonconforming work and appropriate corrective action.

6.9.2 All nonconforming product shall be notified to the customer, client and supplier for monitoring of corrective action implementation.

6.10 Improvement

6.10.1 The organization shall continually improve the effectiveness of the quality management system using the quality policy, quality objectives, audit results, analysis of data, corrective actions and management review.

6.11 Corrective Action

6.11.1 The organization shall have documented procedures for corrective action to eliminate the cause and potential cause of nonconformities. The procedures shall include complaints to the organization and complaints from customers relating to the product, production, workmanship and materials. Records of all complaints and the corrective action taken shall be maintained.

6.12 Technical Service

6.12.1 When requested by a customer or client, the organization shall provide technical advice to customers regarding the processing and application of products and operations which are the subject of this schedule where required.

6.13 Marking

6.13.1 The marking shall comply to BS EN 13369:2018 Section 7.

7. INSPECTION AND TESTING

The inspection and testing shall comply to BS EN 13369:2018 Section 6.

7.1 Test Methods

The test methods shall comply to BS EN 13369:2018 Section 5.

8. QUALITY PLAN

8.1 The organization shall produce a documented quality plan, which covers general production operations and specific site requirements. To ensure a degree of consistency between organizations, the quality plans shall include the followings:

1. The requirements of this schedule and ISO 9001:2015.
2. The definition and identification of contract specific requirements and related documents including internal and external audit reporting requirements.
3. A definition of the organizational responsibilities and authorities, particularly those pertaining to verification activities.
4. The resource requirements including processes, materials and equipment.
5. The identification and status of factory personnel.
6. The approval and verification requirements of purchased services and material.
7. A procedure for reviewing the work programme, adjustments to the work programme and records of programme review.
8. Procedures for office activities including communication between the office and the manufacturing site.
9. Method statements relating to factory activities, including work instructions, quality procedures, records, inspection and test arrangements and work acceptance procedures.
10. Procedures for the control of factory and critical outsourced operation documentation.
11. Procedure for dealing with non-conformances.
12. Procedures to identify training needs and records to demonstrate that all personnel are adequately and appropriately trained and identified.
13. Procedures for quality audit and management review of the implementation of the quality plan.
14. The identification of hold points, the verification required, the verification responsibilities and the authority for release at each production stage.
15. The selection and employment of suppliers.
16. A review of the completed contract including an analysis of defects.

9. INSPECTION & TEST PLAN (ITP)

- 9.1 The organization shall produce a documented inspection and test plan for each of the manufacturing stage. The minimum requirements of such a document should include:
1. The various stages of manufacturing referencing the control / inspection records
 2. Responsibilities for completion of the records (Job title / position)
 3. Responsibilities for checking of the records (Job title / position), if applicable
 4. The identification of “hold points” where applicable at each manufacturing stage
 5. The identification of the responsible individuals to release to the next stage
 6. The identification of the records necessary to allow release to the next stage
 7. The method of release (signature, email etc.)
- 9.2 Such information may be provided in tabular form or in a flow diagram but shall provide enough clarity to ensure the requirements of this schedule are met.
- 9.3 Documents used for recording of the shall be controlled with appropriate document reference numbers and version control where necessary.
- 9.4 All records of the production and release signatures shall be made available for inspection at the factory or during office audits (in cases of completed projects / orders) and stored appropriately in line with requirements of this schedule.

10. SAFETY AND ENVIRONMENTAL REQUIREMENT

- 10.1 Staff in fabrication plant shall have the requisite Personal Protection Equipment, example, safety helmet, safety shoes and any other safety equipment as deemed necessary by the safety officer.
- 10.2 The fabrication organization shall have procedures for safety and ensuring the safety of its staff and the general public.
- 10.3 The fabrication organization shall ensure that they comply with relevant regulatory requirement with regard to environmental issue.

11. NORMATIVE REFERENCES

- 11.1 The following standards are relevant to the application of this scheme document. Unless agreed otherwise during the application process, the latest version of the product or management system standards will apply.

- *ISO 9001: 2015 Quality Management Systems – Requirements*
- *BS EN 13670: 2009 Execution of concrete structures*
- *ISO10012-1: 2003: Quality assurance requirements for measuring equipment*
- *BS EN 197-1: 2000 Cement – Part 1: Composition, specification and conformity criteria for common cements*
- *BS EN 934-2: 2009+A1:2012 Admixtures for concrete, mortar and grout. Concrete admixtures. Definitions, requirements, conformity, marking and labelling*
- *BS EN 934-4: 2009 Admixtures for concrete, mortar and grout. Admixtures for grout for prestressing tendons. Definitions, requirements, conformity, marking and labelling*
- *EN 1992-1-1: 2004 Eurocode 2: Design of concrete structures. General rules and rules for buildings*
- *SS EN 206:2014 Concrete. Specification, performance, production and conformity*
- *SS 544 - 1: 2019 Concrete – Complementary Singapore Standard to SS EN 206 – Part 1: Method of specifying and guidance for the specifier*
- *SS 544 - 2: 2019 Concrete – Complementary Singapore Standard to SS EN 206 – Part 2 : Specification for constituent materials and concrete*
- *EN 12504-1 Testing concrete in structures. Cored specimens. Taking, examining and testing in compression*
- *EN 12504-2 Testing concrete in structures. Non-destructive testing. Determination of rebound number*
- *EN 12390-6 Testing hardened concrete. Part 6: Tensile splitting strength of test specimens*
- *EN 12390-3 Testing hardened concrete. Part 3: Compressive strength of test specimens*
- *EN 12390-2 Testing hardened concrete. Part 2: Making and curing specimens for strength tests*
- *EN 12390-1 Testing hardened concrete. Part 1: Shape, dimensions and other requirements for specimens and moulds*
- *EN 12504-1 Testing concrete in structures. Part 1: Cored specimens. Taking, examining and testing in compression*
- *EN 10080 Steel for the reinforcement of concrete. Weldable reinforcing steel*
- *BS 5896: 2012 Specification for high tensile steel wire and strand for the prestressing of concrete.*
- *prEN 10138-1:2000 Prestressing steels Part 1: General requirements prEN 10138-2:2000 Prestressing steels Part 2: Wire*
- *prEN 10138-3:2000 Prestressing steels Part 3: Strand prEN 10138-4:2000 Prestressing steels Part 4: Bar*
- *SS 560:2016 Specification for steel for the reinforcement of concrete – Weldable reinforcing steel – Bar, Coil and decoiled product*
- *SS 561:2010 Specification for steel fabric for the reinforcement of concrete*