



ACCREDITATION SCHEME FOR PRODUCT
CERTIFICATION BODIES

CT 22
**SAC CRITERIA FOR CERTIFICATION
BODIES (IN-SITU POST TENSIONING
WORKS)**

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1 Introduction

- 1.1 This document specifies the additional definitions and supplementary criteria for certification bodies (CBs) of Specialist Builders (In-situ Post Tensioning Works). It is to be used with ISO/IEC 17065 and the applicable IAF mandatory documents.

2 Abbreviations

The following abbreviations are used in this document:

BCA	Building and Construction Authority
BS EN	British Standard adoption of European Standard
CARES	UK CARES (UK Certification Authority for Reinforcing Steels)
CB	Certification Body
CoC	Certificate of Conformity
SB	Specialist Builder
EXC	Execution Class
ETA	European Technical Assessment
EAD	European Assessment Document
FPC	Factory Production Control
PT	Post Tensioning
PT Kit	Post Tensioning System
SS EN	Singapore Standard of European Standard
RCSB	Requirements for Certification of Specialist Builders (In--Situ Post Tensioning Works)

3 Definitions

The following definitions apply:

- 3.1 Minor non-conformity
Deviation from the requirements of ISO 9001, SS EN 1992-1-1, Requirements for Certification of Specialist Builders (In-situ Post Tensioning Works) or any of their normative reference documents and which is considered not to constitute an immediate risk to the quality of the concrete structure and PT installed by the SB.

- 3.2 Major non-conformity
Deviation from specified requirements or the absence of, or failure to implement and maintain one or more required factory production or installation control system requirements, or a situation which would, on the basis of available objective evidence raise significant doubt as to the conformity of the PT installed by the SB.

4 Certification Scheme

- 4.1 The scheme is based on the demonstration of the continuing operation of the quality management system consistent with ISO 9001 together with appropriate Quality and Operation Assessment Schedules and the ability to design, manufacture, supply and install PT Kits for projects complying with the following specifications:

- a) Prestressing strands manufactured to BS 5896 or EN10138-3
- b) Anchorages for post tensioned systems approved to BS EN 13391 or EAD160004-00-0301, sections 2.2.1, 2.2.2. and 2.2.3 respectively
- c) Duct systems for post-tensioned tendons complying with the requirements of *fib* bulletin 75 or EN 523 to 524
- d) Cement grout complying with BS EN 445 to 447
- e) The organisational and procedural requirements of ISO 9001
- f) Guidance on the Post Tensioning Operation may also be found in TR72 and BS EN13670
- g) CARES Model Specification for Bonded and Unbonded Post-Tensioned Floors in Non-Highway Structures, 4th Edition
- h) Any requirements as detailed in Building and Construction Authority Approved Document
- i) BS EN 13670-2009 Execution of Concrete Structures, Chapter 7 Prestressing

- 4.2 CB shall ensure that the PT Kit's performance that the SB is installing on projects has been verified by qualification testing to comply with the required standards and specifications as specified in Clause 4.1 and that FPCs confirm that PT Kit Components supplied by the SB to projects are from identical geometry and material properties as have been used for the qualification testing of the PT Kit (assessment and verification of constancy of performance).

- 4.3 FPC systems (audited by accredited certification body) shall cover fabrication plants for all related processes, production lines and/or departments, including those outsourced or operated by SB and those managed through the supply chain of the licensor of the PT Kit (the PT Kit manufacturer). CB shall audit and verify that the PT Kit is installed on site by trained & qualified site crews in line with installation instructions defined for PT Kits with ETA and requirements as stated in the contract and technical specifications as specified in Clause 4.1 unless the latter conflict with the EAD requirements.

- 4.4 The Quality system shall cover the design, fabrication, supply and installation of PT kits, for all fabrication and installation procedures & processes.
- 4.5 If the Quality Management System of the PT installer has been certified to ISO 9001 by a CB accredited by SAC or an International Accreditation Forum Multilateral Recognition Arrangement (IAF MLA) partner, the CB may use the accredited certificate in support of the certification for specialist builders (in-situ post tensioning works).

5 Certification Body Auditors

- 5.1 A CB shall appoint qualified auditors to conduct audits on SB for in-situ post tensioning works. Auditors shall meet the criteria specified in **Annex 1**.

6 Review of Application

- 6.1 The purpose of the review is to establish that the SB has the capability to supply and install post-tensioning systems to the relevant Standards.
- 6.2 The SB's application will be subjected to an initial review by the CB. This review will be based upon:
- a) The written description of the SB's quality system.
 - b) RCSB

In order to confirm by explanation that the described arrangements are being implemented and are effective, a favourable review will be followed by the audit of:

- a) The SB's office practices & procedures, including available resources (e.g., personnel, equipment, workshop), training & qualification of site crews, site practices & procedures including site controls and records.
- b) Representative samples of the SB's site practices and procedures, including method statements & inspection test plans, resources, training & qualification of site crews, site controls and records.

If at any stage the application does not in the view of CB justify the expense of proceeding further, the SB will be notified in writing and given reasons.

7 Audit of the Specialist Builder

7.1 The audit will be conducted by CB's competent auditor and the programme will provide for:

- a) An introductory Stage 1 meeting with the Applicant during which the assessment procedures will be explained and an overview of their capabilities obtained.
- b) A timetable of audit activities so that arrangements can be made for appropriate staff to be available during the assessment.
- c) Full Stage 2 audit in accordance with RCSB:

The office activities and site controls e.g., contract review, document control, requirements for and procurement of the PT Kit components, calibration of equipment, method statements & inspection test plans and training & qualification of site crews.

Examples of key site activities – grout trials, duct installation and testing, tendon installation, stressing, grouting and sealing of ducts vents & grout caps and post grout inspection.

Table 1 – Number of Audits and Mandays for Initial or Re-certification every 3 years in addition to Table 2.

Type of Audit	No. of Audits / Mandays
Office	1 / 2
Sites	2 / 4

- d) A final meeting with CB's auditor(s) to present audit findings (the audit report) to the Applicant.

7.2 For SB, whose office practice satisfies RCSB's criteria, but where through lack of a suitable project, it is not possible to undertake a satisfactory assessment of the SB's site practice, a letter of pre-certification will be issued by CB. The letter will detail the scope of the activities audited: Office Activities in relation to ISO 9001 and technical requirement of the RCSB as appropriate.

- a) The letter of pre-certification will only be issued when the SB has undertaken to inform CB when a suitable contract has been awarded to allow CB to assess representative samples of the SB's site practice and procedures, including method statements & inspection test plans, resources, training & qualification of site crews, site controls and records.

The letter of precertification shall be valid for a period of 6 months but may be reissued for a further 6 months if necessary.

b) When CB has been notified of a suitable contract, a site audit will be conducted in accordance with Clause 7.1 (c) above.

7.3 A recommendation for conformity will be provided when both office and site practice have been audited and the above criteria have been satisfied and all reported nonconformities have been addressed to the satisfaction of CB.

7.4 The CB reviews and approves if the SB meets the requirements of the Scheme and issues a CoC.

8 Continuous Surveillance

8.1 The task for a CB during the surveillance visits will be detailed in prepared audit plans based on previous audits and findings with a standard checklist for each installation procedure, including a vertical audit of inspected records for completed levels.

8.2 The frequency of yearly surveillance visits shall be in accordance with Table 2.

Table 2 – Frequency of Yearly Surveillance Audits

Audit Type	Contract tonnage per year		
	0-1000t	>1000t	>2000t
Office	1	1	1
Announced Site	0	1	2
Unannounced Site	1	2	3
Total	2	4	6

8.3 The CB may request for more frequent visits from that given in Table 2, subjected to major nonconformities identified during the periodic site audits.

8.4 If major nonconformities are found, a follow up audit will be taken within 2 months of the date of the raised non-conformance and will not be counted as part of the frequency as detailed in Table 2.

Examples of major non-conformance include, but not limited to:

- Nonconformities in PT installation procedures
- The use of non-approved PT Kit and/or kit components
- Incomplete or incorrect material inspection documents
- Lack of availability of necessary inspection records and signatures for each installed level
- Incomplete technical knowledge about the PT Kit's installation procedure by the SB's person in charge of the site installation
- Site installation by non-trained & non-qualified personnel
- Significant defects in kit components and/or assembled Post Tensioning Tendons

- 8.5 An additional surveillance audit may be required for one of the following reasons:
- Different installed PT system to the original approved system
 - Significant changes in personnel (e.g., Change in management, high turnover rate of workers, etc.), identified by the receipt of training records or deployment of personnel without adequate or appropriate training & qualification.

9 Duration and Frequency of Audits

- 9.1 In determining the duration of an audit, a CB shall consider the complexity and duration of the project as detailed in their monthly project notification. Invariably each site or office audit will last no longer than 2 days.

10 Certification Conformity

- 10.1 The CoC is valid for three years with renewal subject to continuing satisfactory performance.
- 10.2 The certificate shall state:
- a) The scope of the approval i.e., those products/services and relevant Standards which are within the assessed capability of the SB
 - b) The name of the SB
 - c) The certification number applicable to the SB
 - d) The original date of issue (i.e., start of validity) and due date of the next surveillance shall be indicated clearly on the certificate. The certificate shall only be valid subject to continuous surveillance visits by the CB.

A sample of the CoC is provided in **Annex 2**.

- 10.3 SB granted with CoC are required to notify CB of all post-tension contracts on award of contract using the Notification of Contracts form provided by CB. Please see **Annex 3** for sample form format. This information together with the information derived from the Schedule of Operations will be used to determine the CB inspection regime. It is a condition of the granting of the Certificate that CB shall assess:
- a) The office activities once per year against the relevant audit schedule including the training requirements in Section 6.5 of RCSB.
 - b) A representative sample of site practice at least one time per year. The representative sample of site practice should include each of the installation activities. Audits of site practice may be conducted on an unannounced basis by direct agreement with the client.

- c) Where the SB has no PT contracts that fall within the scope of this scheme in one calendar year, CB shall assess the office activities at least once a year. The SB shall notify CB of the first suitable PT contract, which shall be assessed.
 - d) Where the SB has no PT contracts that fall within the scope of this scheme for a period of three calendar years, the Certificate of Conformity shall be withdrawn.
 - e) The SB shall undergo a re-certification audit every 3 years of their quality management system by CB as required in Table 1. Depending on the activities reviewed during the previous 3 year period in addition to the normal office audit this may also include a site audit to review those activities not observed during the previous 3 year period.
- 10.4 The CB reserves the right to request further audits where deemed to be necessary. The results of the audit shall be reported to the SB. If satisfactory, a renewal certificate will be issued.

11 Withdrawal of the Certificate of Conformity

- 11.1 The decision to withdraw a CoC is made by the CB. After the decision, the SB in question has the right to appeal to the Appeals Panel.

Examples of the reasons for withdrawal of the CoC are:

- a) Frequent non-compliance with any of the specified properties or other criteria specified in the relevant Standard
- b) Uncorrected deficiencies noted during a surveillance visit
- c) Misuse of CoC and/or CB's and/or SAC's mark
- d) Refusal or hindrance to allow CB to verify inspection or testing records
- e) Circumstances which may affect the confidence of the public or authorities on the reliability

12 Records

- 12.1 CB will maintain confidential records relating to review, auditing and approval of applicant for 5 years. These records are not available for issue to third parties except due to legal requirements or with the expressed permission of the SB, which must be provided in writing to the CB.

Criteria for CB Auditors

The summary of the criteria for auditors performing audits is tabulated below.

Criteria	Auditors
Personal Attributes	Demonstrate personal attributes for effective and efficient performance of audits
Auditing Knowledge	Have attended and successfully completed an accredited ISO 9001 Lead Auditors course
Formal Education	Relevant Degree or Diploma in Engineering or equivalent field
Other Qualifications	<ul style="list-style-type: none"> • Have basic technical knowledge about post-tensioning • Have knowledge of current regulatory requirements and applicable Codes of Practice
Work Experience	<p>Minimum relevant working experience which includes:</p> <ul style="list-style-type: none"> • at least 3 years work experience in post-tensioning in a technical, professional or supervision position <p>OR</p> <ul style="list-style-type: none"> • minimum 3 years audit experience in auditing of construction products and process.
Awareness of documents detailed in Clause 4.1	Completed awareness training on the relevant specifications/schemes detailed, with appropriate training records available.
Audit Experience	<p><u>Auditors</u> Minimum 1 Product certification audit on site of a PT installation project, which cover the main installation, stressing and grouting procedures.</p> <p><u>Lead Auditors</u> Minimum 3 Product certification audits on site of a PT installation project, which cover the main installation, stressing and grouting procedures.</p> <p>The audit team should have at least one person with audit experience in product certification (ISO/IEC 17065).</p>
Maintenance of qualification (every 3 years)	<p><u>Auditors</u> Perform a minimum of 3 Product certification audits on site of a PT installation project, which cover the main installation, stressing and grouting procedures.</p>

	<u>Lead Auditors</u> Perform a minimum of 3 Product certification audits on site of a PT installation project, which cover the main installation, stressing and grouting procedures, with at least 1 audit performed in the capacity of a team leader .
Management of Personnel	As a <u>Lead Auditor</u> demonstrate personal attributes for effective and efficient management and control of other team auditors

Note

Audits can be initial, surveillance (include critical processes) or recertification audits.

[Name and address of CB]

Certificate of Conformity

[Certificate Number]

Construction product and its trade name	e.g. Structural components and kits according to RCSB <i>produced by</i>
Kit Manufacturer	[Name of Manufacturer Company] [Address of Manufacturer Company] <i>in the plant</i>
PT Kit Component Manufacturers	[List of names and addresses of Companies]
Specialist Builder	[Name of Company] [Address of Company]
Confirmation	This certificate attests that for the PT Kit certified all provisions concerning the assessment and verification of constancy of performance described in RCSB, with the addition of management system auditing applied, are met and that the PT Kit components are purchased from suppliers with factory production control which fulfils all the prescribed requirements stated therein
Start of Validity	[Original Issue Date] [Current Issue Date]
Next surveillance date	[Date of Next Surveillance Audit] -1 year from date of issue
The certificate will remain valid for 3 years and/or under the condition, that the factory production requirements to achieve the declared characteristics do not change, and the product and the manufacturing conditions in the plant are not modified significantly.	
Expiry Date	

 [Signed by authorized CB person]

[Date of issue]

This Certificate remains the property of <name of CB> and shall be returned upon request. The fabricator is solely responsible for compliance of any product that has the same designation as the product type-tested. Persons relying on this Certificate should verify its validity by checking <name of CB>'s website at <CB website>.

