



ACCREDITATION SCHEME FOR
CERTIFICATION BODIES

CT 31 SAC CRITERIA FOR PRODUCT CERTIFICATION BODIES (PILING WORKS)

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1 INTRODUCTION

- 1.1 This document specifies the additional definitions and supplementary criteria for the certification of Specialist Builder for Piling Works and are to be used with ISO/IEC 17065 and the applicable IAF Guidance.
- 1.2 The objective of the scheme is to give confidence that the installation/piling works complies with the relevant execution of special geotechnical works and customer/project specifications. It involves the assessment of quality and process control system of the specialist builder in executing supervision, monitoring, and appropriate product testing in ensuring conformity with the requirements in this document.

2 DEFINITIONS

The following definitions apply:

2.1 Minor nonconformity

Failure to meet one requirement of relevant EN standards for piling works and its Singapore complementary standards or other reference documents, and which is considered not to constitute a risk to the quality of piling works.

2.2 Major nonconformity

Deviation of product from specified requirements or the absence of, or failure to implement and maintain one or more required production control system requirements, or a situation, which would, on the basis of available objective evidence raise significant doubt as to the conformity of the Specialist Builders (Piling Works).

2.3 Specialist Builder (Piling Works)

Person or body who provides piling works.

2.4 Auditor

A team comprising the minimum of an auditor and a technical expert who performs audit on the activities of the specialist builder to verify conformity to the Scheme's requirements. In the event that a person can comply with and is able to meet the qualification requirements of both auditor and technical expert, he can serve both roles during the audit.

2.5 Technical Expert

A technical expert is the person with the relevant piling works experience, professional qualifications and technical knowledge. He supports the audit team in the technical aspects of the audit.

3 CERTIFICATION CRITERIA

- 3.1 Certification bodies (CBs) shall assess and certify the pile installation works according to the following standards and customer/project specifications:
- a) Bored Piles – BS EN 1536
 - b) Diaphragm Walls – BS EN 1538
 - c) Sheet Pile Walls – BS EN 12063
 - d) Displacement Piles – BS EN 12699
 - e) Micropiles – BS EN 14199
- 3.2 The CB shall perform the certification in accordance with the certification criteria specified in Annex 1. The certification of specialist builders (piling works) shall cover the execution, supervision, testing, monitoring and special requirements for all related processes, production lines and/or departments, including those outsourced or operated by subcontractor. Therefore, the CB shall define the scope of certification of specialist builder (piling works) in terms of processes, units, lines and/or departments.

4. CERTIFICATION BODY PERSONNEL

- 4.1 A CB shall appoint qualified Piling Auditors and Technical Experts to conduct the assessments on Specialist Builders for the piling works. Piling Auditors and Technical Experts shall meet the criteria specified in Annex 2.

5 RECOMMENDATIONS AFTER AN INITIAL CERTIFICATION AUDIT

(Refers to ISO/IEC 17065 Clause 7.4 – Evaluation)

There are four possible recommendations after an initial audit:

- 5.1 Certification will be recommended. No nonconformity was found during the certification visit. A sample of the certificate issued to a specialist builder (piling works) is given in Annex 3.
- 5.2 Certification will be conditional subject to the successful implementation of corrective actions for the minor nonconformities. These minor nonconformities which do not cumulatively indicate a major failure of the production control system and product quality. Certification will be recommended after receipt of a letter which gives satisfactory details of correction and corrective action which will be implemented to remove the nonconformities from the system. The time limit for the receipt of the letter will be two weeks from date of audit.

Correction and corrective action shall be implemented within one month and verified to be satisfactory by the auditor.

- 5.3 Certification will be conditional subject to the successful implementation of corrective actions for the major nonconformity or a few systematic minor nonconformities. These nonconformities accumulate to indicate a major failure of the production control system and product quality. The applicant will be required to submit a letter which gives satisfactory details of correction and corrective action which will be implemented to remove the nonconformities from the system. The time limit for the receipt of the letter will be two weeks from date of audit. Correction and corrective action shall be implemented within 2 months from date of audit.

Certification will not be recommended until the nonconformities have been removed from the system and a satisfactory partial re-audit has been carried out.

If the applicant is not ready for the partial re-audit within six months from the date of initial audit, the application will be lapsed. A new application may then be made.

- 5.4 Certification will not be recommended. A major nonconformity or a number of systematic minor nonconformities which accumulate to indicate a major failure of the production control system and product quality. The extent of the systems failure is considered by the auditor to require more than six months for correction. The applicant will be required to re-apply after a period of at least six months from the date of audit.

6 RECOMMENDATIONS AFTER A RECERTIFICATION AUDIT

There are four possible recommendations after recertification audit:

- 6.1 Certification will be confirmed or renewed. The specialist builder (piling works) complies with the certification criteria with no nonconformity.
- 6.2 Certification will be conditionally confirmed or renewed. A number of minor nonconformities exist which do not cumulatively indicate a major failure of the production control system and product quality. Certification will be confirmed or renewed after receiving a letter from the specialist builder (piling works) stating details of the proposed correction and corrective action which to the judgment of the auditor, will remove the nonconformities from the system after successful implementation. The time limit from the receipt of the letter will be two weeks from date of audit. Correction and corrective action shall be implemented within one month and verified to be satisfactory.

If the correction and corrective action are not implemented by the stipulated date, actions will be initiated to suspend certification.

- 6.3 Suspension of certification is recommended. A major nonconformity or a number of systematic minor nonconformities exist, which accumulate to indicate a major failure of the production control system and product quality. The specialist builder (piling works) will be required to submit a letter stating details of the proposed correction and corrective action which to the judgment of the auditor, will remove the nonconformities from the system after successful implementation. The time limit for the receipt of the letter will be two weeks from the date of audit. Auditor shall assess the correction and corrective action to ensure proposed action(s) are effectively implemented before certification is resumed or renewed.

A partial or full re-audit, as directed by the auditor, will be required within three months before reinstatement or renewal of certification can be recommended.

- 6.4 Withdrawal of certification is recommended. A major nonconformity or a number of systematic minor nonconformities have not been removed from the system after the expiry of suspension of certification.

7. CONDITIONAL CERTIFICATION

- 7.1 A letter of conditional certification may be granted to a specialist builder (piling works) that had fulfilled all certification criteria but has yet to demonstrate compliance through on-site piling audit by the CB due to the lack of suitable on-going piling projects at the time of application or during recertification.

The specialist builder (piling works) undertakes to inform the CB as soon as a suitable contract is awarded and to arrange for the CB to carry out the on-site piling audit within 3 months of work commencement.

The conditional certification letter shall be valid for a period of one year but may be reissued for another year.

- 7.2 Certification will be awarded upon satisfactory on-site piling audit, and all nonconformities raised are addressed to the satisfaction of CB.

8. DURATION OF AUDITS

- 8.1 The duration of audit (the audit man-days include the Technical Expert who supports the audit team in the technical aspects of the audit) for initial and recertification audits for piling works are:

Initial Certification Audit

- 3 audit man-days for the first/two scope of certification
- 0.5 man-days will be required for the subsequent scope of certification including on-site integrity test.

Recertification Audit

- 2 audit team man-days
- 0.5 man-days will be required for the subsequent scope of certification including on-site integrity test.

For subsequent scope(s) utilising different machineries proposed by the specialist builder (piling works) to be audited at the same time or within a reasonably short period as determined by the CB, savings of auditing time is envisaged. It is the CB's responsibility to ensure that adequate time is allocated for audit of multiple scopes.

- 8.2 Certification is valid for 24 months. Recertification is subject to continuing satisfactory performance and conformance to the Scheme's requirements. Recertification audit shall be conducted, and non-conformities raised shall be successfully closed before the expiry of the Certificate of Conformity ("CoC").
- 8.3 Each scope or type of piling works that is included in the certification shall be audited. All scopes shall be audited during initial audit and recertification.

9. EXTENSION OF SCOPE

- 9.1 A minimum audit duration of 1 man-day is to be used for assessing any extension of scope to an existing certification.

10. TRANSFER OF CERTIFICATE OF CONFORMITY

- 10.1 The transfer of certificates shall be based on IAF MD2 – IAF Mandatory Document for the Transfer of Accreditation of Management Systems.
- a) Transfer of certificates between CBs is only allowed for certificates that are still valid. Valid certificates are those that are not expired, withdrawn, terminated, or suspended. For other cases, a new application is required.
 - b) The new CB shall ensure the product, installation site and test standards is the same as that of the previous CoC; the implementation of corrections and corrective actions in respect of all outstanding nonconformities have been verified.

- c) The validity of the transferred CoC shall be limited to the remaining timespan of the recently valid CoC.

11. WITHDRAWAL OF CERTIFICATE OF CONFORMITY

- 11.1 The decision to withdraw a certificate of conformity (CoC) is made by the CB. After the decision, the specialist builder (piling works) in question has the right to appeal to the Appeals Panel.
- 11.2 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 rectification audit.
 - 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.
 - f) Violation of Tendering Limits as specified in the Criteria Document for Specialist Builder (Piling Works) will render this Certificate to be invalid.

12 SUSPENSION OF PILING WORKS AUDIT

- 12.1 If the result of piling works audit do not meet its specified criteria, the CB shall request the specialist builder (piling works) to rectify the defects within a defined short period. The actions taken by the specialist builder (piling works) shall be verified by the CB.
- 12.2 If appropriate, an extraordinary audit and /or additional tests shall be conducted to verify the nonconformity(ies).
- 12.3 If the results of the extraordinary audit are not satisfactory and / or if the additional tests failed the specified criteria, the certification body shall suspend the specialist builder (piling works) from certification without undue delay.

ANNEX 1

CERTIFICATION CRITERIA FOR SPECIALIST BUILDERS (PILING WORKS)

- 1) Piling Machineries
- 2) Material and Products Requirements
- 3) Pile Integrity and Working Load Tests from the Past Records
- 4) Personnel
- 5) Execution Records
- 6) Installation Procedures
- 7) Safety and Environmental Requirements

Table 1: Index of Certification Criteria for Specialist Builders (Piling Works)

S/No.	Certification Criteria	Reference	Remarks
1A	Piling Machineries	- Section 2 - Table 2.1 and 2.2	
1B	Machines Maintenance	- Section 2.2 & 2.3 - Table 2.1 and 2.2	
2	Material & Products Requirements	- Section 3.1 & 3.2 - SS/ BS EN Standards - Project Specifications	
3	Pile Integrity and Load Tests	- Section 4	
4	Personnel	- Section 5 - Table 5.1	
5	Execution Records	- Section 6.1	
6	Installation Procedures	- Section 7 - BS EN Execution Standards	(1) Bored Pile - BS EN 1536 Table B.1 (2) Displacement Pile - BS EN 12699 (3) Micropile - BS EN 14199 (4) Diaphragm Wall - BS EN 1538 Table B.1 (5) Sheet Pile Wall - BS EN 12063
7	Safety and Environmental Requirements	- Section 9	

Table 2: Piling Machineries Checklist

Type of Product		Primary Machines Owned (With Accessories)	Number	Criteria Met	Remarks
(1) Bored Pile	(a) Bored Pile				
(2) Displacement Pile	(a) Driven Pile				
	(b) Jacked Pile				
(3) Micropile	(a) Drilled Micropile				
	(b) Driven Micropile				
	(c) Jacked Micropile				
(4) Diaphragm Wall	(a) Diaphragm Wall				
	(b) Barrette pile				
(5) Sheet Pile Wall	Sheet Pile				

Table 3: Machines Maintenance Checklist

S/No.	Maintenance Items	Frequency			
		Daily (Visual)	Monthly *	Quarterly *	Yearly *
1	Leaks on Engine and Hydraulic Components	X	-	-	-
2	Fuel, Water and Oil level	X	-	-	-
3	Mechanical Structure Integrity	X	-	-	-
4	Electrical Switches, Warning Lamps and Buzzers	X	-	-	-
5	Abnormal Sound from Engine or Electric Motor	X	-	-	-
6	Unusual Pressure, Temperature, Ampere, Voltage	-	X	-	-
7	Check Engine Oil, Fuel, Hydraulic Oil and Filters Elements for Contamination	-	X	-	-
8	Tension all Bolts, Mountings, Transmission Belts, Crawler Tracks	-	X	-	-
9	Mechanical and Electrical Control Functionality	-	x	-	-
10	Wire Ropes, Sheaves and Shafts	-	X	-	-
11	Brake and Clutch Adjustments	-	X	-	-
12	Mechanical Structure Integrity	-	X	-	-
13	Battery and Charging System	-	X	-	-
14	Safety Devices	-	X	-	-
15	Lubricate All Grease Points	-	X	-	-
16	Replace Engine Oil and Filters	-	-	X	-
17	Replace Hydraulic Oil, Gear Oil and Its Filters	-	-	-	X
18	Replace Engine Coolant	-	-	-	X

*Note: These checks should be carried out by Qualified Mechanics

Table 4: Personnel Requirements Checklist

Personnel	Relevant Experience and Qualifications	Number	Criteria Met	Remarks
(1) Technical Manager (TM)				
(2) Piling Engineer				
(3) Geologist *				
(4) Piling Site Supervisor				
(5) Piling Rig Operator				

- Note: Required for Bored Piling, Diaphragm Wall, and Barrette Piles

Table 5: Execution Records

S/No.	Description	Type of Pile	
		Bored Pile / Barrette	Diaphragm Wall
1	Project Reference	x*	x*
2	Element Reference	x*	x*
3	Element Type	x*	x*
4	Equipment Type	x*	x*
5	Equipment Reference	x	x
6	Nominal Cross-Sectional Dimensions	x*	x*
7	Designed Resistance of Element	x*	(x)
8	Required Depth of Element	x*	x*
9	Date and Time of Installation Commencement	x*	x*
10	Date and Time of Installation Completion	x*	x*
11	Date and Time of Concreting Commencement	x*	x*
12	Date and Time of Concreting Completion	x*	x*
13	Details of Concrete Samples Taken	x*	x*
14	Platform Level at Element Installation	x*	x*
15	Cut-Off-Level of Element	x*	x*
16	Depth of Element from Ground / Casing/ Guide Wall Level	x*	x*
17	Toe Level as Constructed	x*	x*
18	Stop End Details	-	x*
19	Length of Temporary Casing	x*	-
20	Length of Permanent Casing	(x)	-
21	Depth and Diameter of Pre-Drilling or Jetting	(x)	(x)
22	Length of Reinforcement	x*	x*
23	Details of Reinforcement	x*	x*
24	Top Level of Reinforcement Cage	x	x
25	Details of Plunged Column	(x)	(x)
26	Concrete Strength	x*	x*
27	Theoretical Volume of Concrete Required	x*	x*
28	Actual Volume of Concrete Used	x*	x*
29	Graph of Concrete Rise vs Volume Placed	x*	x*
30	Depth to Concrete Level Before and After Casing Withdrawal	x*	-
31	Drilling Fluid Test (Type, Density, Viscosity, pH and Sand Content)	(x)	x*
32	Records of Obstruction	(x)	(x)
33	Records of Interruption to Installation	(x)	(x)
34	Records of Unexpected Changes in Installation Characteristics	(x)	(x)
35	Estimated as Constructed Positional Deviation	x	-
36	Description of Ground Excavated	x*	x*
37	Soil Samples to be Taken During Excavation	x*	x*
38	In-Situ Tests Carried Out During Pile Installation (eg. Point Load Test)	(x)	(x)

39	Records of Excavation Profile (Koden or Equivalent)	x	x*
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Legend: x*: Required x: Recommended (x) : Required for Specific Site Condition
- : Not Applicable

CRITERIA FOR PILING AUDITORS

The summary of the criteria for auditors performing audit of piling works is tabulated below.

Criteria	Auditor
Personal Attributes	Demonstrate personal attributes for effective and efficient performance of audits.
Formal Education	Minimum Diploma in Architecture, Building, Structural or Civil Engineering, or other related construction industry.
Other Qualifications	Have knowledge of current regulatory requirements and applicable Codes of Practice.
Work Experience	<ul style="list-style-type: none"> Minimum 5 years full time working experience which includes: <ul style="list-style-type: none"> Minimum 3 years full time working experience in construction- related industry in a technical, professional or supervision position. OR <ul style="list-style-type: none"> Minimum 3 years quality management system audit experience in construction-related industry
Training on Management system and inspection	<ul style="list-style-type: none"> Attended training on ISO 9001. Successfully completed a course on Quality Management Systems Auditor / Lead Auditor (ISO 9001).
Audit Experience	<p><u>Auditor</u> Minimum of 3 product certification audit for construction-related industry within the last 3 years.</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>Auditor</u> Perform minimum of 2 product certification audits for construction-related industry within last 3 years.</p> <p>In addition, the competence of auditors in Clause 6.1.2 of ISO/IEC 17065 shall be demonstrated.</p>

In addition, the audit team shall have personnel with the below qualification and experience to assess the technical aspects of the piling works.

Criteria	Technical Expert
Personal Attributes	Demonstrate personal attributes for effective and efficient performance of audits
Other Qualifications	Have knowledge of current regulatory requirements and applicable Codes of Practice
Work Experience	<p>Degree in Civil Engineering:</p> <p>Minimum of 10 years of working experience in the construction industry which includes:</p> <ul style="list-style-type: none"> • at least 5 years related work experience in piling industries, pile design, consultancy, or related products in a technical, professional or supervision position <p>OR</p> <ul style="list-style-type: none"> • minimum 3 years audit experience in piling industries <p>In addition to above requirements,</p> <p>1. Attended and passed the Certification Course for Piling Personnel and registered with IES/GeoSS for various execution codes on special geotechnical works:</p> <ul style="list-style-type: none"> a) Bored Piles – BS EN 1536 b) Diaphragm Walls – BS EN 1538 c) Sheet Pile Walls – BS EN 12063 d) Displacement Piles – BS EN 12699 e) Micropiles – BS EN 14199

CERTIFICATE OF CONFORMITY (Sample)

Specialist Builder (Piling Works)

This Certificate is issued to

Specialist Builder:

Name of Specialist Builder

Address

FOR

Execution of Specialist Piling Works

Category and Grade of Company being:

Cat. L-G1 piling specialist company for: Sheetpiles

Cat. L-G3 piling specialist company for: Micropiles

Cat. N-G2 piling specialist company for: Bored Piles

Cat. M-G2 piling specialist company for: Driven Piles

(See Appendix/ces for piles)

which has complied with the requirements of the scheme and based on the following:

Standards

BS EN 1536 : YYYY

SAC CT XX : YYYY

Product conformity certificates are awarded based on an assessment of conformity control system and process control covering, execution, supervision, monitoring, and testing, all coupled with assessment of the supporting quality management system.

<Name of CB> is accredited by the Singapore Accreditation Council for certification in respect of Product Certification Systems (ISO/IEC 17065: YYYY and SAC CTXX: YYYY)

Designation

<name of CB>

Certificate No
SBP 01

Date of Original Issue
dd/mm/yyyy

Date of Last Revision

Date of Expiry
dd/mm/yyyy

Start of Validity [Original Issue Date]
[Current Issue Date]
Next Re-Certification Date: [Date of Next Re-Certification Audit] -2
years from date of issue

The certificate will remain valid for 2 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 is part of a full report and should be read in conjunction with it. This Certificate remains the property of <name of CB> and shall be returned upon request. The use of this Certificate is subjected to the terms and conditions of the Piling Works Scheme. The manufacturer 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.