



## ACCREDITATION SCHEME FOR INSPECTION BODIES

# **TECHNICAL NOTE: SI-01**

## **SPECIFIC REQUIREMENTS FOR THE ACCREDITATION OF INSPECTION BODIES FOR SITE INVESTIGATION (SOIL)**

Technical Note – SI - 01 : 2011

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## 1. INTRODUCTION

- 1.1 The purpose of inspections is to ensure the inspection process of site investigation(soil) conform with standards or other normative documents and/or general requirements.
- 1.2 The field of site investigation(soil) covers drilling, functional testing, sampling, storage and transportation of soil/rock samples.
- 1.3 This technical note (SI – 01) should be read in conjunction with document IB 01 “Terms and Conditions”, ISO/IEC 17020, IAF/ILAC-A4 “Guidance on the application of ISO/IEC 17020” and government regulations if applicable.
- 1.4 Supplementary information for specific areas of inspection may be published as other Technical Notes.

## 2. EQUIPMENT

- 2.1 Equipment which affect results that are critical to the conclusion of the examination, sampling and testing shall be appropriate for the particular investigation to be performed.
- 2.2 Inspectors shall ensure that all equipment, including equipment not under the charge of the inspection body, used during investigation work are calibrated and traceable to the SI unit. Calibration shall be performed by recognized accredited laboratories<sup>1</sup> or the National Measurement Institute who is a member of the BIPM<sup>2</sup> MRA where possible. The inspection body should where possible refer to the recommended calibration interval of equipment as specified in relevant SAC-SINGLAS Technical Notes<sup>3</sup>.
- 2.3 Sensitive equipment such as membrane used in Pressuremeter Test shall be verified for functionality before each and every test at site.

## 3. TESTING

- 3.1 Analytical testing as defined in IAF/ILAC-A4 is a laboratory activity and therefore does not come within the scope of ISO/IEC 17020. Examples of analytical testing are atterberg test, sieve analysis, consolidation test, direct shear test, triaxial tests or chemical analysis.
- 3.2 Where analytical testing is required to support the evaluation, the inspection body shall ensure that the testing is performed by an accredited laboratory.

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<sup>1</sup> Recognised accredited laboratories refer to those accredited by SAC-SINGLAS or its MRA partners

<sup>2</sup> BIPM MRA refers to listing of signatories maintained by the International Bureau of Weights and Measures (BIPM) and publicly available on the BIPM website: <http://www.bipm.fr>

<sup>3</sup> Relevant SAC-SINGLAS Technical Notes include SAC-SINGLAS 006 and CE 001

- 3.3 When an organisation is providing analytical testing and inspection for the same project, the organisation has to ensure that there is sufficient independence between the two activities (e.g. results of inspection activities and testing activities should not be approved by the same person).
- 3.4 Functional testing as defined in IAF/ILAC-A4 forms a normal part of the activities of an inspection body and is therefore within the scope of ISO/IEC 17020. Examples of functional testing are Standard Penetration Test (SPT) Vane Shear Test, Pressuremeter Test, Cone Penetration Test (CPT), Field Permeability Test.

## **4 INSPECTION PERSONNEL**

### **4.1 INSPECTORS**

- 4.1.1 Inspectors shall be suitably qualified and have sufficient relevant experience in their scope of inspection.
- 4.1.2 Inspectors must be familiar with the relevant standards or codes used in the inspection activities.
- 4.1.3 Inspection bodies shall note that qualification requirements of inspectors may be superseded or limited by the regulatory requirements of the countries where site investigation(soil) is carried out.
- 4.1.4 Inspection bodies shall maintain records of inspectors' qualifications, training and experience. The records shall include how and when each inspector is authorized by the inspection bodies to perform specific inspection or testing.
- 4.1.5 All approved signatories shall be assessed by the assessment team prior to award of accreditation. Subsequent assessment will consist of sampling of approved signatories.
- 4.1.6 The assessment team will assess the nominated approved signatories. Those assessed to be competent in their area of inspection will be submitted to the Council Committee for Inspection Bodies for endorsement as approved signatories.
- 4.1.7 Approved signatories are to sign on endorsed inspection report for inspection performed by themselves or where they have direct supervision of the inspection work.

## **4.2 QUALIFICATION CATEGORIES FOR INSPECTION TEAM**

### **4.2.1 Driller**

- a. Attended in house training provided by the company or recognized external training centre.
- b. Be able to communicate in basic English.
- c. The competencies of the drillers to be assessed by the approved signatories.

### **4.2.2 Site Investigation Supervisor**

- a. Should have at least:
    - i) Diploma in Civil Engineering or Geology with at least one year experience in site investigation (soil);or
    - ii) Five years experience in site investigation (soil) for other qualification levels.
- And
- b. Site Investigation Supervisor certificate recognised by BCA such as those issued by Geotechnical Society of Singapore (GeoSS) or equivalent.

### **4.2.3 Project Manager**

- a. At least should have Degree in Civil Engineering or Geology.
- b. At least six years experience in site investigation(soil).

### **4.2.4 Approved Signatories**

Registered Professional Engineer(Civil) with the Professional Engineering Board, Singapore

## **5. Format of report**

- 5.1 The inspection report shall contain at least all information attached in Appendix 2 where applicable.
- 5.2 The list attached is not exhaustive and may include requirements as specify by the customer.
- 5.3 Where more than three boreholes are specified for the project, registered surveyor is to be engaged to endorse location and elevation of the borehole.

## **6. INSPECTION METHODS AND PROCEDURES**

- 6.1 The inspection body shall have detailed procedures and instructions for the application of the appropriate regulations, codes of practice, standards, specifications, guidance documents and customer requirements.

- 6.2 It is recommended that site investigation supervisor should not supervise more than two rigs per project.

## **7. Safety and Environmental Requirement**

- 7.1 Staff on-site shall have the requisite Personal Protection Equipment, example, safety helmet, safety shoes and any other safety equipment as deem necessary by the site safety officer.
- 7.2 The company shall have procedures for safety and ensuring the safety of its staff and the general public.
- 7.3 The company shall ensure that they comply with relevant regulatory requirement with regards of environmental issue.

## **8. FORMAT OF ACCREDITATION SCOPE**

The scope of accreditation is granted only for specific items, materials or systems being inspected. An example of the accreditation scope is attached in Appendix 1.

## **9. REFERENCE**

SAC-SINGLAS Technical Notes.

ISO/IEC 17020 "General criteria for the performance of various types of bodies performing inspection.

IAF/ILAC-A4 "Guidance on the application of ISO/IEC 17020"

BS5930 "Code of practice for site investigations"

SS EN 1997 - 2: 2010 "Eurocode 7: Geotechnical Design – Part 2: Ground Investigation and Testing"

**Appendix 1**

Inspection body: Type A or B or C

Type of product	Type and range of inspection	Inspection method, codes or standards used

Approved signatories

Mr YK Tan

- for all items

**NOTE :****Type A inspection body**

The inspection body providing “third party” services.

**Type B inspection body**

The inspection body which forms a separate and identifiable part of an organisation involved in the design, manufacture, supply, installation, use or maintenance of the item it inspects and has been established to supply inspection services to its parent organisation.

**Type C inspection body**

The inspection body which is involved in the design, manufacture, supply, installation, use or maintenance of the items it inspects or of similar competitive items and may supply inspection services to other parties not being its parent organisation.

## Appendix 2

With reference to IAF/ILAC A4;

The following information are to be included in the inspection report (applicable to site/geotechnical report generated)

1. The purpose and scope of the site/geotechnical investigation.
2. Identification of the document, i.e. date of issue and unique identification.
3. Identification of the client, consultants and subcontractors (if any).
4. Description of the work ordered, method adopted and the type of field tests conducted.
5. Date of site/geotechnical investigation conducted.
6. Survey Coordinates of site/geotechnical investigation borehole conducted.
7. Desk studies and field reconnaissance of the site of the project and the surrounding areas.
8. Description of the equipment, methods and procedures used for conducting the field tests.
9. The results of site/geotechnical investigation, including field tests, laboratory tests, findings and issues encountered in the course of boring.
10. Name of the staff member and site investigation supervisor who performed site/geotechnical investigation works.

The following Technical Requirements for Borehole log are the minimum information to be included. Additional information may be required for projects.

1. Project title
2. Date of work,
3. Name of project manager/supervisor/driller
4. Reduced level of the ground
5. Depth of each soil layers
6. Location, Survey Coordinates (using SVY21)
7. Legend and description of the different soil/rock layer
8. Depth and value of SPT, and/or other in-situ test(s)
9. UD Sampling
10. Ground water level
11. Geological formation and weathering grade
12. Total core recovery, Rock Quality Designation, Fracture Index.
13. Rock core photographs (colour)
14. Field/laboratory test results