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**Geotechnical investigation and  
testing — Qualification criteria and  
assessment —**

**Part 1:  
Qualified technician and qualified  
operator**

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*Reconnaissance et essais géotechniques - Critères de qualification et  
évaluation —*

*Partie 1: Technicien et opérateur qualifié*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 182, *Geotechnics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 341, *Geotechnical Investigation and Testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 24283 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The ISO 24283 series specifies the qualification criteria for geotechnical investigation and testing and has three parts:

- Part 1: Qualified technician and qualified operator
- Part 2: Responsible expert
- Part 3: Qualified enterprise

The fulfilment of the technical criteria by the enterprise or the individual can be proven by:

- a) a declaration of conformity by a contractor (first party control);
- b) a declaration of conformity by a client (second party control);
- c) a declaration of conformity by a conformity assessment body (third party control).

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# Geotechnical investigation and testing — Qualification criteria and assessment —

## Part 1: Qualified technician and qualified operator

### 1 Scope

This document specifies the qualification criteria for a person performing sampling, testing, measuring, monitoring and installation of equipment (e.g. piezometers, borehole heat exchangers, inclinometers and extensometers) in the framework of geotechnical investigation.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1

##### **qualified technician**

qualified operator

person who has documented competence to perform specified parts of identification and description of soil and rock sampling, laboratory and field testing, measuring, monitoring and installation of equipment

#### 3.2

##### **vocational training**

on-the-job or work place training

### 4 Qualification criteria

The qualified technician and qualified operator should have documented competence regarding the following:

- a) basic knowledge of the purpose of geotechnical ground investigation, of geological, soil and rock properties and hydrogeological principles as relevant for the respective standard;
- b) specified parts of identification and description of soil and rock, sampling, laboratory and field testing, measuring, monitoring and installation of any equipment in boreholes (e.g. piezometers, borehole heat exchangers, inclinometers and extensometers) according to the relevant standard (see Bibliography) in the framework of geotechnical investigation;
- c) relevant work experience (e.g. see [Table A.1](#) or [Table A.2](#));

- d) preparation of records according to the relevant standard (see Bibliography);
- e) the relevant health, safety and environmental regulations;
- f) the functioning, safe operation and maintenance of the equipment (including field checks);
- g) the relevant part of quality management system.

Assessment and re-assessment of qualified technicians should be carried out in accordance with [Annex A](#).

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## Annex A (informative)

### Assessment and re-assessment of qualified technicians and operators

#### A.1 General

This annex gives guidelines and recommendations for an assessment body in addition to ISO/IEC 17024.

#### A.2 Prerequisites for admission to assessment

The prerequisites for admission to the qualification assessment should be:

- minimum age at the time of the assessment: 18 years;
- sufficient knowledge of the assessment language;
- completed vocational training of a relevant subject and proof of suitable work experience (see [Table A.1](#)) in an enterprise that performs specified parts of identification and description of soil and rock, sampling, laboratory and field testing, measuring, monitoring and/or installation of equipment in boreholes; or  
proof of suitable work experience (see [Table A.2](#)) in an enterprise that performs specified parts of sampling, laboratory and field testing, measuring, monitoring and/or installation of equipment in boreholes according to the relevant standards;
- documented formal training in preparation of the assessment (see [Annex B](#)).

**Table A.1 — Requirements concerning the work experience for a qualified technician and operator for field testing with a completed vocational training of a relevant subject**

Subject	Relevant standard	Minimum years of relevant work experience
Identification and description of soil and rock	ISO 14688-1 and ISO 14689	1
Geothermal response test	ISO 17892	1
Installation of a geothermal heat exchanger	ISO 17892	1
Extensometer measurements	ISO 18674-2	1
Installation of extensometers	ISO 18674-2	1
Inclinometer measurements	ISO 18674-3	1
Installation of inclinometers	ISO 18674-3	1
Groundwater measurements in open systems	ISO 18674-4	1
Groundwater measurements in closed systems	ISO 18674-4	1
Installation of piezometers (open systems)	ISO 18674-4	1
Installation of piezometers (closed systems)	ISO 18674-4	2
Water permeability tests in a borehole using open systems	ISO 22282-2	1
NOTE This list can be expanded by national standards.		

Table A.1 (continued)

Subject	Relevant standard	Minimum years of relevant work experience
Water pressure tests	ISO 22282-3	1
Pumping tests	ISO 22282-4	1
Infiltrometer tests	ISO 22282-5	1
Water permeability tests in a borehole using closed systems	ISO 22282-6	2
Sampling in soil (sampling categories A to C)	ISO 22475	2
Sampling in soil (sampling categories C to E)	ISO 22475	1
Sampling in soil (sampling category E)	ISO 22475	1
Sampling in rock (sampling categories A to C)	ISO 22475	2
Sampling in rock (sampling categories C to E)	ISO 22475	1
Sampling in rock (sampling category E)	ISO 22475	1
Electric cone penetration tests	ISO 22476-1	1
Dynamic probing	ISO 22476-2	1
Standard penetration test	ISO 22476-3	1
Ménard pressuremeter test	ISO 22476-4	1
Flexible dilatometer test	ISO 22476-5	1
Self-boring pressuremeter test	ISO 22476-6	1
Borehole jack test	ISO 22476-7	1
Full displacement dilatometer	ISO 22476-8	1
Field vane test	ISO 22476-9	1
Weight sounding test	ISO 22476-10	1
Flat dilatometer test	ISO 22476-11	1
Mechanical cone penetration test	ISO 22476-12	1
Borehole dynamic probing	ISO 22476-14	1
Measuring while drilling	ISO 22476-15	1
NOTE This list can be expanded by national standards.		

Table A.2 — Requirements concerning the work experience for a laboratory qualified technician and operator with a completed vocational training of a relevant subject

Subject	Relevant standard	Minimum years of relevant work experience
<b>Soil testing</b>		
Understanding of the basis for lab testing	To be determined	1
Preparation of samples	To be determined	1
Recognition of sample disturbance	To be determined and ISO 22475	1
Identification and description of soil and rock	ISO 14688-1 and ISO 14689	1
Water content test	ISO 17892-1	1
NOTE 1 This table does not attempt to list all of the specialist soil and rock tests that are performed less regularly than the routine tests given in the table.		
NOTE 2 This list can however be expanded by national standards to reflect the types of tests undertaken in different countries.		

Table A.2 (continued)

Subject	Relevant standard	Minimum years of relevant work experience
Atterberg limit tests	ISO 17892-12	1
Particle size distribution tests (for both fine and coarse soils)	ISO 17892-4	1
Particle density	ISO 17892-3	1
Dry density – water content relationship test	To be determined	2
California bearing ratio (CBR) test	To be determined	1
Moisture condition value (MCV)	To be determined	1
Undrained triaxial strength	ISO 17892-8	2
Undrained triaxial strength with pore water pressure measurement	ISO 17892-9	3
Drained triaxial strength with porewater pressure measurement	ISO 17892-9	3
Ring shear test	To be determined	2
Small shear box test	ISO 17892-10	2
Large shear box test	ISO 17892-10	2
Triaxial permeability test	ISO 17892-11	3
Hydraulic cell permeability	ISO 17892-11	3
<b>Rock testing</b>		
Point load test	To be determined	1
Unconfined compressive strength (UCS)	To be determined	2
Brazil test	To be determined	1
Rock direct shear test	To be determined	1
Aggregate condition value (ACV)	To be determined	1
10 % fines test	To be determined	1
Aggregate impact value (AIV)	To be determined	1
Los Angeles abrasion test	To be determined	1
NOTE 1 This table does not attempt to list all of the specialist soil and rock tests that are performed less regularly than the routine tests given in the table.		
NOTE 2 This list can however be expanded by national standards to reflect the types of tests undertaken in different countries.		

Table A.3 — Requirements concerning the professional experience for a qualified technician and operator for field testing without a completed vocational training of a relevant subject

Subject	Relevant standard	Minimum years of relevant work experience
Identification and description of soil and rock	ISO 14688-1 and ISO 14689	3
Geothermal response test	ISO 17892	2
Installation of a geothermal heat exchanger	ISO 17892	3
Extensometer measurements	ISO 18674-2	2
Installation of extensometers	ISO 18674-2	3
Inclinometer measurements	ISO 18674-3	2
NOTE This list can be expanded by national standards.		