

**SLOVENSKI STANDARD**  
**SIST EN ISO 18674-1:2015**  
**01-september-2015**

---

**Geotehnično preiskovanje in preskušanje - Geotehnične meritve - 1. del: Splošna pravila (ISO 18674-1:2015)**

Geotechnical investigation and testing - Geotechnical monitoring by field instrumentation - Part 1: General rules (ISO 18674-1:2015)

Geotechnische Erkundung und Untersuchung - Geotechnische Messungen - Teil 1: Allgemeine Regeln (ISO 18674-1:2015)

Reconnaissance et essais géotechniques - Surveillance géotechnique par instrumentation in situ - Partie 1: Règles générales (ISO 18674-1:2015)

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>

**Ta slovenski standard je istoveten z: EN ISO 18674-1:2015**

---

**ICS:**

93.020	Zemeljska dela. Izkopavanja.	Earthworks. Excavations.
	Gradnja temeljev. Dela pod zemljo	Foundation construction. Underground works

**SIST EN ISO 18674-1:2015**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 18674-1:2015](https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>

EUROPEAN STANDARD

EN ISO 18674-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2015

ICS 13.080.20; 93.020

English Version

## Geotechnical investigation and testing - Geotechnical monitoring by field instrumentation - Part 1: General rules (ISO 18674- 1:2015)

Reconnaissance et essais géotechniques - Surveillance  
géotechnique par instrumentation in situ - Partie 1: Règles  
générales (ISO 18674-1:2015)

Geotechnische Erkundung und Untersuchung -  
Geotechnische Messungen - Teil 1: Allgemeine Regeln  
(ISO 18674-1:2015)

This European Standard was approved by CEN on 30 April 2015.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**Contents**

Page

Foreword.....3

**iTeh STANDARD PREVIEW  
(standards.iteh.ai)**

SIST EN ISO 18674-1:2015

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>

## Foreword

This document (EN ISO 18674-1:2015) has been prepared by Technical Committee ISO/TC 182 "Geotechnics" in collaboration with Technical Committee CEN/TC 341 "Geotechnical Investigation and Testing" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2015, and conflicting national standards shall be withdrawn at the latest by November 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 18674-1:2015 has been approved by CEN as EN ISO 18674-1:2015 without any modification.

iteh STANDARD PREVIEW  
(standards.iteh.ai)

[SIST EN ISO 18674-1:2015](https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 18674-1:2015](https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>

INTERNATIONAL  
STANDARD

ISO  
18674-1

First edition  
2015-05-15

---

---

**Geotechnical investigation and  
testing — Geotechnical monitoring by  
field instrumentation —**

**Part 1:  
General rules**

**iTeh STANDARD PREVIEW**  
*Reconnaissance et essais géotechniques — Surveillance géotechnique  
par instrumentation in situ —  
(standards.iteh.ai)  
Partie 1: Règles générales*

[SIST EN ISO 18674-1:2015](https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>



Reference number  
ISO 18674-1:2015(E)

© ISO 2015

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 18674-1:2015](https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015)

<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org



# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and symbols</b> .....	<b>2</b>
3.1 Terms.....	2
3.2 Symbols.....	4
<b>4 Principal requirements</b> .....	<b>5</b>
4.1 Geotechnical monitoring in connection with geotechnical design.....	5
4.2 Geotechnical monitoring in connection with specific questions.....	5
4.3 Requirements of a geotechnical monitoring project.....	5
4.4 Geodetic measurements.....	6
4.5 Safety requirements.....	6
<b>5 Requirements of a geotechnical monitoring system</b> .....	<b>6</b>
5.1 General.....	6
5.2 Robustness.....	7
5.3 Influencing factors.....	7
5.4 Redundancy.....	7
5.5 Stability of sensor signal.....	7
5.6 Function check and calibration.....	8
<b>6 Location of measuring points and geotechnical parameters</b> .....	<b>8</b>
6.1 Location of measuring points.....	8
6.1.1 The measuring points can be located at free surfaces, at the interface between any two media, or inside of a medium.....	8
6.2 Measurement and monitoring of geotechnical parameters.....	8
<b>7 Carrying out the measurements</b> .....	<b>9</b>
<b>8 Data processing and verification</b> .....	<b>9</b>
<b>9 Reporting</b> .....	<b>10</b>
9.1 Installation report.....	10
9.2 Monitoring report.....	11
<b>Annex A (normative) Minimum requirements on content of instrument data sheets</b> .....	<b>13</b>
<b>Annex B (normative) Geotechnical measurements in boreholes</b> .....	<b>14</b>
<b>Annex C (informative) Field measurements in connection with the design and construction of geotechnical structures</b> .....	<b>17</b>
<b>Annex D (informative) Measurement and monitoring of geotechnical key parameters</b> .....	<b>19</b>
<b>Annex E (informative) Types of instruments and monitoring methods commonly used</b> .....	<b>21</b>
<b>Bibliography</b> .....	<b>27</b>

## ISO 18674-1:2015(E)

## 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information \(standards.iteh.ai\)](http://Foreword - Supplementary information (standards.iteh.ai))

ISO 18674-1 was prepared by European Committee for Standardization (CEN) in collaboration with ISO/TC 182, *Geotechnics*, Subcommittee SC 01, *Geotechnical investigation and testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 18674 consists of the following parts, under the general title *Geotechnical investigation and testing* — *Geotechnical monitoring by field instrumentation*:

— *Part 1: General rules*

The following parts are under preparation:

— *Part 2: Displacement measurements along a line: Extensometers*

The following parts are planned:

— *Part 3: Displacement measurements across a line: Inclinometers*

— *Part 4: Piezometers*

— *Part 5: Total pressure cells*

— *Part 6: Hydraulic settlement gauges*

— *Part 7: Strain gauges*

— *Part 8: Load cells*

— *Part 9: Geodetic monitoring instruments*

— *Part 10: Vibration monitoring instruments*

NOTE For further information on geotechnical monitoring by field instrumentation, see References [1] to [7].

# Geotechnical investigation and testing — Geotechnical monitoring by field instrumentation —

## Part 1: General rules

### 1 Scope

This part of ISO 18674 lays out the general rules for the performance monitoring of the ground, of structures interacting with the ground, of geotechnical fills, and of geotechnical works.

NOTE ISO 18674 fulfils the requirements for general rules for the performance monitoring of the ground, of structures interacting with the ground, of geotechnical fills, and of geotechnical works as part of the geotechnical investigation and testing according to EN 1997-1<sup>[8]</sup> and EN 1997-2<sup>[9]</sup>.

Specifically, this part of ISO 18674 applies to field instrumentation and measurements carried out

- in connection with site investigations of soils and rocks,
- in connection with Observational Design procedures,
- in connection with the performance of geotechnical structures before, during, and after construction,
- for ground behaviour evaluation, e.g. unstable slopes, consolidation etc.,
- for the proof or follow-up of a new equilibrium within the ground, after disturbance of its natural state by construction measures (e.g. foundation loads, excavation of soil, tunnelling),
- for the proof or follow-up of the stability, serviceability, and safety of structures and operations which might be influenced by geotechnical construction,
- for perpetuation of evidence, and
- for the evaluation and control of geotechnical works.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14688-1, *Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description*

ISO 14689-1, *Geotechnical investigation and testing — Identification and classification of rock — Part 1: Identification and description*

ISO 22475-1, *Geotechnical investigation and testing — Sampling methods and groundwater measurements — Part 1: Technical principles for execution*

ISO/IEC Guide 99:2007, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

## ISO 18674-1:2015(E)

### 3 Terms and symbols

#### 3.1 Terms

For the purposes of this document, the terms and definitions given in ISO/IEC Guide 99:2007 and the following apply.

##### 3.1.1

##### **geotechnical monitoring**

observation of the ground behaviour and/or performance of geotechnical structures before, during, and/or after construction

Note 1 to entry: Geotechnical monitoring is an integral part of the Observational Design procedure (see EN 1997-1: 2004).

Note 2 to entry: Geotechnical monitoring is based on field observation, including construction site inspection.

##### 3.1.2

##### **field instrument**

measuring tool to assist geotechnical monitoring

Note 1 to entry: Monitoring by field instruments comprises the measurement of physical parameters, in particular, the change of the parameter values.

##### 3.1.3

##### **geotechnical key parameter**

physical parameter indicative of the geotechnical issue under consideration and subject to geotechnical monitoring

EXAMPLE Displacement (absolute or relative), strain, inclination, stress, pore pressure, earth pressure, force, velocity, acceleration, temperature.

STANDARD PREVIEW  
(standards.iteh.ai)  
<https://standards.iteh.ai/catalog/standards/sist/5caf1c8f-62cc-4118-be15-38c1cdfb0f3d/sist-en-iso-18674-1-2015>

##### 3.1.4

##### **geotechnical monitoring project**

entirety of aspects and processes which, in a specific project, are relevant for geotechnical monitoring

Note 1 to entry: Includes planning, risk assessment, specifying, procurement, delivery, and installation of a project-specific monitoring system and collecting, processing, evaluating, and reporting of the monitoring data.

##### 3.1.5

##### **geotechnical monitoring concept**

preliminary plan for the measurement of geotechnical key parameters developed within the conceptual design phase, identifying specific objectives such as risk mitigation to be addressed by monitoring, thereby considering type of measurement, measuring locations, and schedule(s) for carrying out the measurement

##### 3.1.6

##### **geotechnical monitoring plan**

advancement of the monitoring concept within the specification design phase

##### 3.1.7

##### **geotechnical monitoring system**

hardware and software to provide field data

Note 1 to entry: Includes instruments signal, transmission (e.g. electric cables), data acquisition, and auxiliary units.

Note 2 to entry: The performance (e.g. the accuracy, stability, precision) of the geotechnical monitoring system will not necessarily be identical to the performances of the system components.

##### 3.1.8

##### **geotechnical monitoring programme**

entirety of those components of a monitoring project which can be systematically planned, consisting of a monitoring plan and monitoring system