



SLOVENSKI STANDARD
oSIST prEN ISO 19901-8:2022
01-februar-2022

Industrija za predelavo nafte in zemeljskega plina - Posebne zahteve za naftne ploščadi - 8. del: Preiskave morskega dna (ISO/DIS 19901-8:2021)

Petroleum and natural gas industries - Specific requirements for offshore structures - Part 8: Marine soil investigations (ISO/DIS 19901-8:2021)

Erdöl- und Erdgasindustrie - Spezielle Anforderungen für Offshore-Anlagen - Teil 8: Meeresbodenuntersuchungen (ISO/DIS 19901-8:2021)

Industries du pétrole et du gaz naturel - Exigences spécifiques relatives aux structures en mer - Partie 8: Investigations des sols en mer (ISO/DIS 19901-8:2021)

Ta slovenski standard je istoveten z: [oSIST prEN ISO 19901-8:2022](http://standards.sis.si/catalog/standards/sis/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022)
prEN ISO 19901-8

ICS:

75.180.10	Oprema za raziskovanje, vrtanje in odkopavanje	Exploratory, drilling and extraction equipment
-----------	--	--

oSIST prEN ISO 19901-8:2022

en,fr,de

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

oSIST prEN ISO 19901-8:2022

<https://standards.iteh.ai/catalog/standards/sist/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022>

DRAFT INTERNATIONAL STANDARD

ISO/DIS 19901-8

ISO/TC 67/SC 7

Secretariat: BSI

Voting begins on:
2021-12-16Voting terminates on:
2022-03-10

Petroleum and natural gas industries — Specific requirements for offshore structures —

Part 8: Marine soil investigations

*Industries du pétrole et du gaz naturel — Exigences spécifiques relatives aux structures en mer —
Partie 8: Investigations des sols en mer*

ICS: 75.180.10

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

[oSIST prEN ISO 19901-8:2022](https://standards.iteh.ai/catalog/standards/sist/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022)

<https://standards.iteh.ai/catalog/standards/sist/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 19901-8:2021(E)

© ISO 2021

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

oSIST prEN ISO 19901-8:2022

<https://standards.iteh.ai/catalog/standards/sist/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

1	Scope	1
2	Normative references	2
3	Terms and definitions.....	2
4	Symbols, units and abbreviated terms	6
4.1	Symbols	6
4.2	Units.....	7
4.3	Abbreviated terms	7
5	Objectives, planning and requirements	9
5.1	Objectives	9
5.2	Planning	10
5.2.1	Sequence of activities.....	10
5.2.2	Integrated geoscience studies.....	12
5.3	Scope of work and development of project specifications	12
5.4	Health, safety and environmental requirements for marine operations.....	13
5.4.1	General	13
5.4.2	Investigation vessel	13
5.4.3	Hazardous substances and acoustic noise.....	14
5.4.4	Shallow gas.....	14
5.5	Other requirements.....	15
5.5.1	Operational requirements	15
5.5.2	Quality requirements.....	15
5.5.3	Specific considerations for unconventional soils	15
6	Deployment of investigation equipment.....	16
6.1	Non-drilling mode deployment.....	16
6.2	Drilling mode deployment.....	16
6.2.1	General	16
6.2.2	Vessel drilling	17
6.2.3	Seafloor drilling.....	17
6.3	Accuracy of vertical depth measurements	17
6.3.1	General	17
6.3.2	Factors affecting the accuracy of vertical depth measurements.....	18
6.3.3	Depth accuracy classes	18
6.4	Horizontal positioning.....	19
6.5	Interaction of investigation equipment with the upper seabed.....	19
7	Drilling and logging.....	19
7.1	General	19
7.2	Project-specific drilling requirements	20
7.3	Drilling objectives and selection of drilling equipment and procedures.....	20
7.4	Drilling operations plan	21
7.5	Recording of drilling parameters	21
7.6	Borehole geophysical logging	22
7.6.1	General	22
7.6.2	Reporting of results	22
8	<i>In situ</i> testing.....	23
8.1	General	23
8.2	General requirements for the documentation of <i>in situ</i> tests	23
8.3	Cone penetration test.....	24

ISO/DIS 19901-8:2021(E)

8.3.1	General.....	24
8.3.2	Equipment	24
8.3.3	Test procedures.....	25
8.3.4	Procedures for testing offshore	27
8.3.5	Presentation of test results and reporting.....	29
8.4	Pore pressure dissipation test	30
8.4.1	General.....	30
8.4.2	Equipment	31
8.4.3	Test procedure.....	31
8.4.4	Presentation of results.....	31
8.5	Ball and T-bar penetration tests.....	32
8.5.1	General.....	32
8.5.2	Equipment	34
8.5.3	Ball and T-bar conformity assessment.....	34
8.5.4	Test procedures to be followed offshore.....	34
8.5.5	Presentation of test results and reporting.....	35
8.6	Seismic cone penetration test.....	36
8.6.1	General.....	36
8.6.2	Equipment	37
8.6.3	Test procedures	37
8.6.4	Presentation of results.....	38
8.7	Other <i>in situ</i> tests	38
8.7.1	General.....	38
8.7.2	Documentation requirements.....	39
9	Sampling.....	39
9.1	Purpose and objectives of sampling.....	39
9.2	Sampling systems.....	39
9.3	Selection of samplers.....	40
9.3.1	General.....	40
9.3.2	Drilling mode samplers.....	41
9.3.3	Non-drilling mode samplers.....	42
9.4	Sample recovery considerations	43
9.5	Handling, transport and storage of samples	44
9.5.1	General.....	44
9.5.2	Offshore sample handling	44
9.5.3	Offshore storage	45
9.5.4	Onshore transport, handling and storage.....	46
10	Laboratory testing	46
10.1	General.....	46
10.2	Project specifications.....	46
10.3	Presentation of laboratory test results.....	47
10.4	Instrumentation, calibration and data acquisition.....	47
10.5	Preparation of soil specimens for testing	48
10.5.1	Minimum sample size and specimen dimensions	48
10.5.2	Preparation of disturbed samples and soil batching	48
10.5.3	Preparation of undisturbed specimens (fine-grained soils).....	48
10.5.4	Laboratory-prepared compacted and reconstituted specimens	49
10.5.5	Preparation of remoulded samples.....	51
10.6	Evaluation of intact sample quality	51
11	Reporting	52
11.1	Definition of reporting requirements.....	52

11.2	Presentation of field operations and factual data	52
11.3	Data interpretation and soil parameters	53
Annex A	(informative) Additional information and guidance	55
A.1	Scope	55
A.2	Normative references	55
A.3	Terms and definitions	55
A.4	Symbols, units and abbreviated terms	55
A.5	Objectives, planning and requirements	55
A.5.1	Objectives	55
A.5.2	Planning	55
A.5.3	Scope of work	60
A.5.4	Health, safety and environmental requirements for marine operations	60
A.5.5	Other requirements	65
A.6	Deployment of investigation equipment	67
A.6.1	Non-drilling mode deployment	67
A.6.2	Drilling mode deployment	67
A.6.3	Accuracy of vertical depth measurements	67
A.6.4	Horizontal positioning	73
A.6.5	Interaction of investigation equipment with the seafloor	73
A.7	Drilling and logging	74
A.7.1	General	74
A.7.2	Project-specific drilling requirements	74
A.7.3	Drilling objectives and selection of drilling equipment and procedures	74
A.7.4	Drilling operations plan	78
A.7.5	Recording of drilling parameters	78
A.7.6	Borehole geophysical logging	78
A.8	<i>In situ</i> testing	81
A.8.1	General	81
A.8.2	General requirements for the documentation of <i>in situ</i> tests	81
A.8.3	Cone penetration test	81
A.8.4	Pore pressure dissipation test	85
A.8.5	Ball and T-bar penetration test	85
A.8.6	Seismic cone penetration test	85
A.8.7	Other <i>in situ</i> tests	87
A.9	Sampling	88
A.9.1	Purpose and objectives of sampling	88
A.9.2	Sampling systems	88
A.9.3	Selection of samplers	88
A.9.4	Sample recovery considerations	94
A.9.5	Handling, transport and storage of samples	94
A.10	Laboratory testing	97
A.10.1	General	97
A.10.2	Project specifications	97
A.10.3	Presentation of laboratory test results	97
A.10.4	Instrumentation, calibration and data acquisition	97
A.10.5	Preparation of soil specimens for testing	97
A.10.6	Evaluation of intact sample quality	97
A.11	Reporting	97
A.11.1	Definition of reporting requirements	97
A.11.2	Presentation of field operations and factual data	98
A.11.3	Data interpretation and soil parameters	100

ISO/DIS 19901-8:2021(E)

Annex B (normative) Procedures for calibration and verification of cone penetrometers.....	103
B.1 Environment and preparation	103
B.2 Measuring intervals for calibration.....	103
B.3 Symbols.....	104
B.4 Cone resistance and sleeve friction calibration.....	105
B.4.1 General.....	105
B.4.2 Test method	105
B.4.3 Assessment of calibration uncertainty.....	107
B.4.4 Calibration results	109
B.5 Calibration of pore pressure sensor.....	110
B.5.1 General.....	110
B.5.2 Test method	110
B.5.3 Assessment of calibration uncertainty.....	111
B.5.4 Test results	112
B.6 Determination of cone and friction sleeve dimensions	112
B.6.1 General.....	112
B.6.2 Test method	112
B.6.3 Assessment of dimensional uncertainty.....	113
B.6.4 Test results	114
B.7 Calibration of a cone penetrometer for inclination.....	115
B.7.1 General.....	115
B.7.2 Test method	115
B.7.3 Inclination uncertainty	115
B.7.4 Test results	116
B.8 Verification of a cone penetrometer for temperature influence	116
B.8.1 General.....	116
B.8.2 Test method	117
B.8.3 Test results	117
B.9 Verification of a cone penetrometer for bending influence	119
B.9.1 General.....	119
B.9.2 Test method	119
B.9.3 Test results	119
Annex C (informative) Calibration certificate for cone penetrometer	120
C.1 General.....	120
C.2 Example calibration report	120
Annex D (informative) Laboratory testing.....	128
D.1 General.....	128
D.2 Classification and index tests.....	128
D.2.1 Soil identification and description	128
D.2.2 Soil classification.....	128
D.2.3 Sample photograph	128
D.2.4 Non-destructive sampling logging	129
D.2.5 Water content.....	129
D.2.6 Liquid and plastic limits	129
D.2.7 Bulk density of soil or soil unit weight	129
D.2.8 Particle density of soil	130
D.2.9 Maximum and minimum index densities.....	130
D.2.10 Particle size distribution	130
D.2.11 Angularity	131
D.2.12 Organic content.....	131
D.2.13 Carbonate content.....	131
D.2.14 Soluble salt content	132

D.2.15	Undrained shear strength index tests.....	132
D.2.16	Soil sensitivity.....	136
D.2.17	Needle penetration resistance.....	136
D.3	One-dimensional consolidation	136
D.3.1	General	136
D.3.2	Incremental loading oedometer tests.....	137
D.3.3	Continuous loading oedometer tests.....	138
D.3.4	Dismounting the specimen.....	138
D.3.5	Determination of horizontal stress.....	139
D.3.6	Presentation of results	139
D.4	Consolidated triaxial tests.....	139
D.4.1	General	139
D.4.2	Test apparatus.....	140
D.4.3	Preparation of triaxial test specimens.....	143
D.4.4	Saturation.....	143
D.4.5	Consolidation	144
D.4.6	Static shearing	145
D.4.7	Cyclic testing.....	146
D.4.8	Dismounting the specimen.....	146
D.4.9	Presentation of test results.....	147
D.5	Direct shear tests.....	148
D.5.1	General	148
D.5.2	Direct simple shear.....	148
D.5.3	Ring shear.....	154
D.5.4	Direct shear box.....	157
D.6	Resonant column	157
D.6.1	General	157
D.6.2	Test procedure	158
D.6.3	Presentation of test results.....	158
D.7	Test for shear wave velocity and initial shear modulus using bender elements.....	159
D.8	Thixotropy.....	159
D.9	Permeability	160
D.10	Thermal conductivity and volumetric heat capacity tests	161
D.11	Geological and geochemical tests	161
D.11.1	General	161
D.11.2	Visual description.....	161
D.11.3	Mineralogical analysis	161
D.11.4	Amino acid chronology.....	162
D.11.5	Stable oxygen isotope analysis	162
D.11.6	Gas in sediment samples.....	162
D.11.7	Age determination (¹⁴ C dating)	162
D.11.8	Paleontological analyses.....	162
D.11.9	Soil corrosiveness.....	162
D.12	Rock testing	162
D.13	Other laboratory tests.....	163
	Bibliography	165

ISO/DIS 19901-8:2021(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).

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).

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.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 7, *Offshore structures*.

This second edition cancels and replaces the first edition (ISO 19901-8:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- application classes for *in situ* testing tools are removed and replaced by an assessment of documented calibration results and uncertainty analyses;
- a new normative annex is introduced to define the procedures for calibration and verification of cone penetrometers;
- a new informative annex is included with an example calibration certificate for cone penetrometers;
- annexes have been restructured according to the main text and ISO guidelines for ease of reading;
- references to project specifications for technical details have been reduced where possible and roles and responsibilities have been further clarified.

A list of all parts in the ISO 19901 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.

Introduction

The series of International Standards applicable to offshore structures, ISO 19900 to ISO 19906, constitutes a common basis covering those aspects that address design requirements and assessments of all offshore structures used by the petroleum and natural gas industries worldwide. Through their application, the intention is to achieve reliability levels appropriate for manned and unmanned offshore structures, whatever the nature or combination of the materials used.

It is important to recognize that structural integrity is a concept comprising models for describing actions, structural analyses, design rules, safety elements, workmanship, quality control procedures and national requirements, all of which are mutually dependent. The modification of one aspect of design in isolation can disturb the balance of reliability inherent in the overall concept of structural integrity (see ISO 19900). The implications involved in modifications, therefore, need to be considered in relation to the overall reliability of all offshore structural systems.

This document is applicable for marine soil investigation, which is only one of many possible marine site investigations as illustrated in Figure 1.

The scope of a marine soil investigation, such as field programme, equipment to be used, laboratory testing programme, soil parameters to be established and reporting, is usually defined in project specifications based on important factors, such as type of structures involved, type of soil conditions expected, regional or site-specific investigation, preliminary or final soil investigations. The reporting can comprise anything from field data only to reporting of soil parameter values.

This document gives requirements, recommendations and guidelines for the planning and execution of marine soil investigations and is applicable from the planning phase to reporting of soil parameter values.

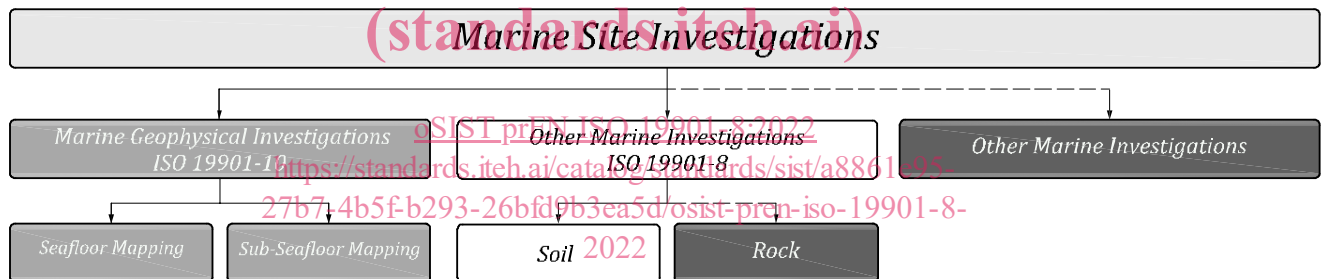


Figure 1 — Marine soil investigations shown as one of many types of marine site investigations

This document is applicable for marine soil investigations at any water depth and to any depth below seafloor which can be reached with the tools used.

Use of this document is based on the assumptions that:

- good communication takes place between geophysical and geotechnical specialists for defining the scope of the marine soil investigation based on the results of the geophysical investigation (see ISO 19901-10);
- adequate communication takes place between geotechnical personnel involved in marine soil investigations and the personnel responsible for foundation design, for construction and for installation of the offshore structures;
- soil data are collected, recorded and interpreted by qualified personnel;
- the project-specific scope of work for marine soil investigations is defined by one or more project specifications.

The detailed requirements for equipment and methods given in this document are only applicable if relevant for the scope of work defined in the project specifications.

ISO/DIS 19901-8:2021(E)

This document is intended to provide flexibility in the choice of marine soil investigation techniques without hindering innovation.

In ISO documents, the following verbal forms are used:

- 'shall' and 'shall not' are used to indicate requirements strictly to be followed in order to comply with the document and from which no deviation is permitted;
- 'should' and 'should not' are used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited;
- 'may' and 'need not' are used to indicate a course of action permissible within the limits of the document;
- 'can' and 'cannot' are used for statements of possibility and capability, whether material, physical or causal.

This document includes both informative and normative annexes. Annex A is an informative annex, which gives additional information intended to assist the understanding or use of this document. The clause number in Annex A is the same as in the normative main text to facilitate cross-referencing. Annex B is a normative annex, which presents methods for calibration and verification of cone penetrometers. Annex C is an informative annex, which presents an example report from the calibration and measurement of cone penetrometer sensors. Annex D is an informative annex, which covers conduct of laboratory tests as part of marine soil investigations.

PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 19901-8:2022](https://standards.iteh.ai/catalog/standards/sist/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022)
<https://standards.iteh.ai/catalog/standards/sist/a8861e95-27b7-4b5f-b293-26bfd9b3ea5d/osist-pren-iso-19901-8-2022>

Petroleum and natural gas industries — Specific requirements for offshore structures — Part 8: Marine soil investigations

1 Scope

This document specifies requirements, and provides recommendations and guidelines for marine soil investigations regarding:

- a) objectives, planning and execution of marine soil investigations;
- b) deployment of investigation equipment;
- c) drilling and logging;
- d) *in situ* testing;
- e) sampling;
- f) laboratory testing;
- g) reporting.

Soil type references throughout this document follow the ISO 14688-1:2017 and ISO 14688-2:2017 definitions. Rock materials are only covered by this document to the extent that marine soil investigation tools can be used, e.g. for chalk, calcareous soils, cemented soils or similar soft rock.

Hard rock investigations are not covered by this document.

NOTE 1 Clause D.13 provides guidance.
Foundation design is not covered by this document.

NOTE 2 ISO 19901-4 and the respective design standards for the specific types of offshore structures as listed in the Foreword cover foundation design.

The results from marine geophysical investigations are, when available and where appropriate, used for planning, optimization and interpretation of marine soil investigations.

This document neither covers the planning, execution and interpretation of marine geophysical investigations nor the planning and scope of geohazard assessment studies, only the corresponding marine soil investigations aspects thereof.

NOTE 3 ISO 19901-10 covers the planning, execution and interpretation of marine geophysical investigations.

This document provides requirements and guidance for obtaining measured values and derived values. This document excludes requirements and guidance for determination of design and representative values.

This document is intended for clients, soil investigation contractors, designers, installation contractors, geotechnical laboratories and public and regulatory authorities concerned with marine soil investigations for any type of offshore structures, or geohazard assessment studies.

ISO/DIS 19901-8:2021(E)

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 22476-1:2012, *Geotechnical investigation and testing — Field testing — Part 1: Electrical cone and piezocone penetration test*

ISO 19900, *Petroleum and natural gas industries — General requirements for offshore structures*

ISO 14688-1:2017, *Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description*

ISO 14688-2:2017, *Geotechnical investigation and testing — Identification and classification of soil — Part 2: Principles for a classification*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

For the purposes of this document, the following terms and definitions shall 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 accuracy

closeness of agreement between a measured quantity value and a true quantity value of a measurand

3.2 borehole geophysical logging

measurement of physical properties of a borehole and/or the surrounding soil, obtained by one or more logging probes deployed in the borehole

3.3 client

party or person with overall responsibility for the marine soil investigation, including preparation of project specifications

3.4 coordinate reference system

coordinate system that is related to an object by a datum

Note 1 to entry: Geodetic and vertical datums are referred to as reference frames.

Note 2 to entry: For geodetic and vertical reference frames, the object will be the Earth. In planetary applications, geodetic and vertical reference frames may be applied to other celestial bodies.

3.5 contractor

party or person responsible for an assigned scope of work described in project specifications

3.6 derived value

value of a geotechnical parameter obtained from test results by theory, correlation or empiricism

3.7**design value**

value derived from the representative value for use in the design verification

[SOURCE: ISO 19900:2019, 3.14]

3.8**disturbed sample**

sample whose soil structure, water content and/or constituents have changed as a result of sampling and handling

3.9**drained condition**

condition whereby the applied stresses and stress changes are supported by the soil skeleton and do not cause a change in pore pressure

3.10**drilling mud****drilling fluid**

fluid pumped down a rotary drilled borehole to facilitate the drilling process

Note 1 to entry: The hardware associated with handling drilling fluids is commonly prefixed 'mud' (e.g. mud tank, mud pump, mud valve). Drilling parameters associated with drilling fluids are similarly prefixed (mud pressure, mud flow, etc.).

3.11**geohazard**

geological condition that has the potential to have adverse effects on persons, operations, infrastructure or the environment

3.12**ground model**

2- or 3-dimensional representation of the seafloor (bathymetry) and, where applicable, the sub-seafloor conditions, at a given time, that is specific to the offshore structure(s) considered

3.13**ground truthing**

integration of seafloor or sub-seafloor geophysical data with data acquired by marine soil investigation and other data

3.14**in-pipe logging**

borehole geophysical logging in a section of the borehole or drill pipe between the tool and the borehole wall

Note 1 to entry: The number of parameters that can be usefully measured in these circumstances is restricted.

3.15**intact sample**

sample that was collected with intention to preserve its *in situ* characteristics

Note 1 to entry: Term can be taken as equivalent to undisturbed sample used in other ISO documents.

3.16**integrated geoscience study**

combination of geophysical data, a model for geological processes and geotechnical data for development of a ground model