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Oil and gas industries including lower carbon energy — Offshore structures —

Part 8: Marine soil investigations

Industries du pétrole et du gaz y compris les énergies à faible teneur en carbone — Structures en mer —

Partie 8: Investigations des sols en mer

Reference number
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Contents

Page

Foreword ... **v**

Introduction ... **vi**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **2**

4 Symbols, units and abbreviated terms ... **6**
4.1 Symbols ... 6
4.2 Units ... 11
4.3 Abbreviated terms ... 12

5 Objectives, planning and requirements ... **14**
5.1 Objectives ... 14
5.2 Planning ... 14
5.2.1 Sequence of activities ... 14
5.2.2 Integrated geoscience studies ... 16
5.3 Scope of work and development of project specifications ... 17
5.4 Health, safety and environmental requirements for marine operations ... 18
5.4.1 General ... 18
5.4.2 Investigation vessel ... 18
5.4.3 Hazardous substances and acoustic noise ... 19
5.4.4 Shallow gas ... 19
5.5 Other requirements ... 20
5.5.1 Operational requirements ... 20
5.5.2 Quality requirements ... 20
5.5.3 Specific considerations for unconventional soils ... 21

6 Deployment of investigation equipment ... **21**
6.1 Non-drilling mode deployment ... 21
6.2 Drilling mode deployment ... 21
6.2.1 General ... 21
6.2.2 Vessel drilling ... 22
6.2.3 Seafloor drilling ... 22
6.3 Uncertainty of vertical depth measurements ... 22
6.3.1 General ... 22
6.3.2 Factors affecting the uncertainty of vertical depth measurements ... 23
6.3.3 Depth uncertainty classes ... 23
6.4 Horizontal positioning ... 24
6.5 Interaction of investigation equipment with the upper seabed ... 24

7 Drilling and logging ... **25**
7.1 General ... 25
7.2 Project-specific drilling requirements ... 25
7.3 Drilling objectives and selection of drilling equipment and procedures ... 26
7.4 Drilling operations plan ... 26
7.5 Recording of drilling parameters ... 27
7.6 Borehole geophysical logging ... 27
7.6.1 General ... 27
7.6.2 Reporting of results ... 28

8 In situ testing ... **28**
8.1 General ... 28
8.2 General requirements for the reporting of in situ tests ... 29
8.3 Cone penetration test ... 30
8.3.1 General ... 30
8.3.2 Equipment ... 30

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8.3.3 Test procedures ... 31
8.3.4 Procedures for testing offshore ... 34
8.3.5 Presentation of test results ... 36
8.4 Pore pressure dissipation test ... 37
8.4.1 General ... 37
8.4.2 Equipment ... 38
8.4.3 Test procedure ... 38
8.4.4 Presentation of results ... 38
8.5 Ball and T-bar penetration tests ... 39
8.5.1 General ... 39
8.5.2 Equipment ... 41
8.5.3 Calibration and verification of ball and T-bar penetrometers ... 41
8.5.4 Procedures for testing offshore ... 41
8.5.5 Presentation of results ... 42
8.6 Seismic cone penetration test ... 43
8.6.1 General ... 43
8.6.2 Equipment ... 44
8.6.3 Procedures for testing offshore ... 44
8.6.4 Presentation of results ... 45
8.7 Other in situ tests ... 45
8.7.1 General ... 45

9 Sampling ... 46
9.1 Purpose and objectives of sampling ... 46
9.2 Sampling systems ... 46
9.3 Selection of samplers ... 46
9.3.1 General ... 46
9.3.2 Drilling mode samplers ... 47
9.3.3 Non-drilling mode samplers ... 48
9.4 Sample recovery considerations ... 49
9.5 Handling, transport and storage of samples ... 50
9.5.1 General ... 50
9.5.2 Offshore sample handling ... 51
9.5.3 Offshore storage ... 52
9.5.4 Onshore transport, handling and storage ... 52

10 Laboratory testing ... 52
10.1 General ... 52
10.2 Project specifications ... 53
10.3 Presentation of laboratory test results ... 53
10.4 Instrumentation, calibration and data acquisition ... 54
10.5 Preparation of soil specimens for testing ... 54
10.5.1 Minimum sample size and specimen dimensions ... 54
10.5.2 Preparation of disturbed samples and soil batching ... 54
10.5.3 Preparation of intact specimens (fine soils) ... 55
10.5.4 Laboratory-prepared compacted and reconstituted specimens ... 55
10.5.5 Preparation of remoulded samples ... 57
10.6 Evaluation of intact sample quality ... 57

11 Reporting ... 58
11.1 Reporting requirements ... 58
11.2 Presentation of field operations and factual data ... 59
11.3 Data interpretation and soil parameters ... 59

Annex A (informative) **Additional information and guidance ... 61**

Annex B (informative) **Laboratory testing ... 109**

Bibliography ... 146

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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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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, *Oil and gas industries including lower carbon energy*, Subcommittee SC 7, *Offshore structures,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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

The main changes are as follows:

— application classes for in situ testing tools are removed and replaced by an assessment of documented calibration results and uncertainty analyses;

— new procedures for calibration and verification of cone penetrometers are introduced with reference to the latest edition of ISO 22476-1.

— references to project specifications for technical details have been reduced where possible and roles and responsibilities have been further clarified.

— title and scope change adopted as per Technical Management Board Resolution 53/2022.

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.

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Introduction

The International Standards on offshore structures prepared by TC 67/SC 7 (ISO 19900, the ISO 19901 series, ISO 19902, ISO 19903, ISO 19904, ISO 19905 series and ISO 19906) constitute 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. Application specific requirements for different energy industries are referencing relevant overarching standards. For example, for the offshore wind industry the IEC standards IEC 61400-1 and IEC 61400-3-1 outline the normative design requirements (e.g. return periods) for offshore turbine support structures.

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, should be considered in relation to the overall reliability of all offshore structural systems.

A marine soil investigation 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.

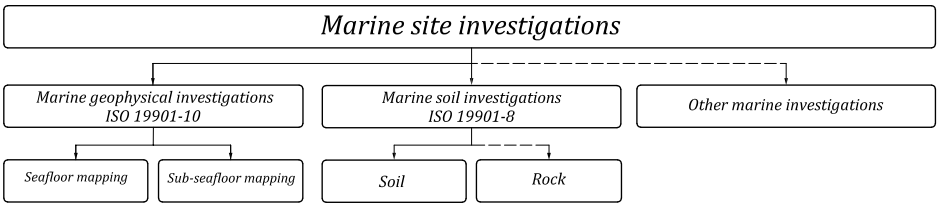


Figure 1 — Marine soil investigations shown as one of many types of marine site investigations.

Use of this document is based on the following assumptions:

— communication takes place between geophysical and geotechnical specialists for defining the scope of the marine soil investigation based on the results of a geophysical investigation (see ISO 19901-10);

— 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, documented and interpreted by trained 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.

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

In this document, the following verbal forms are used:

— “shall” indicates a requirement;

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— “should” indicates a recommendation;

— “can” indicates a possibility or a capability;

— “may” indicates a permission.

Information marked as “NOTE” is intended to assist the understanding or use of the document. “Notes to entry” used in Clause 3 provide additional information that supplements the terminological data and can contain requirements relating to the use of a term.

Annex A gives additional information intended to assist the understanding or use of this document. The clause numbers in Annex A correspond to the normative main text to facilitate easy cross-referencing. Annex B covers conduct of laboratory tests as part of marine soil investigations.

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Oil and gas industries including lower carbon energy — 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.

Although this document focuses on investigations of soil, it also provides guidance, with less detail, for investigations of chalk, calcareous soils, cemented soils and weak rock.

Foundation design is not covered by this document.

NOTE 1 ISO 19901-4 and the respective design standards covering foundation design for the specific types of offshore structures to meet the requirements of application specific standards are given on the ISO website.

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

This document specifies requirements and provides guidance for obtaining measured values and derived values. This document excludes requirements for determination of design values and representative values. Limited guidance is provided in 11.3 related to data interpretation.

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.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

ISO 14689, *Geotechnical investigation and testing — Identification, description and classification of rock*

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

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

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14688-1, ISO 14688-2, ISO 14689 and the following apply:

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
accuracy
closeness of agreement between a measured quantity value and a true quantity value of a measurand

[SOURCE: ISO/IEC Guide 99:2007, 2.13]

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.

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

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