SLOVENSKI STANDARD
oSIST prEN ISO 19901-1:2024

01-oktober-2024

Naftna in plinska industrija, vključno z nizkoogljično energijo - Posebne zahteve za naftne ploščadi - 1. del: Določila za načrtovanje in obratovanje ob upoštevanju oceanografskih in meteoroloških vidikov (ISO/DIS 19901-1:2024)

Oil and gas industries including lower carbon energy - Specific requirements for offshore structures - Part 1: Metocean design and operating considerations (ISO/DIS 19901-1:2024)

Erdöl- und Erdgasindustrie - Spezielle Anforderungen für Offshore-Anlagen - Teil 1: Grundsätze für die Auslegung und den Betrieb auf dem offenen Meer (ISO/DIS 19901-1:2024)

Industries du pétrole et du gaz naturel - Exigences spécifiques relatives aux structures en mer - Partie 1: Dispositions océano-météorologiques pour la conception et l'exploitation (ISO/DIS 19901-1:2024)

Ta slovenski standard je istoveten z: prEN ISO 19901-1

ICS:

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

oSIST prEN ISO 19901-1:2024 **en,fr,de**

DRAFT
International Standard

ISO/DIS 19901-1

Oil and gas industries including lower carbon energy — Specific requirements for offshore structures —

Part 1: Metocean design and operating considerations

ICS: 75.180.10

ISO/TC **67**/SC **7**

Secretariat: **BSI**

Voting begins on:
2024-08-15

Voting terminates on:
2024-11-07

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 19901-1:2024(en)

Contents

Page

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 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

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 third edition cancels and replaces the second edition (ISO 19901-1:2015), which has been technically revised.

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

— Clarification on the role of the metocean expert (Section 5.2 and Annex A.5.2)

— Additional information related to the determination of associated criteria (Section 5.3 and Annex A.5.3)

— Additional information related to the estimation of extreme/abnormal conditions (Section 5.7 and Annex A.5.7)

— Alignment of the wind normative and informative sections with API RP 2MET (Section 7 and Annex A.7)

— Additional information related to breaking/non-breaking wave kinematic estimation (Section 8.4.3 and Annex A.8.4.3)

— Expansion to section on additional environment factors to be considered (Section 10 and Annex A.10)

— Introduction of Normative and Informative text related to the verification of weather forecast information (Sections 12 and Annex A.12)

— Update to Offshore Canada Regional Annex (Annex D)

— Update to Sakhalin/Sea of Okhotsk Regional Annex (Annex E)

— Update to Caspian Sea Regional Annex (Annex F)

— Introduction of Mediterranean Sea Regional Annex (Annex H)

— Introduction of Brazil Regional Annex (Annex I)

— Re-introduction of US Gulf of Mexico Regional Annex (Annex J)

— Re-introduction of Coast of California Regional Annex (Annex K)

— Re-introduction of Overview of Regions Excluding Gulf of Mexico and California Regional Annex (Annex J)

A list of all parts in the ISO 19901-1 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 types of offshore structure, 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 type of structure and the nature or combination of the materials used.

It is important to recognize that structural integrity is an overall 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 may disturb the balance of reliability inherent in the overall concept or structural system. The implications involved in modifications, therefore, need to be considered in relation to the overall reliability of all offshore structural systems.

The series of International Standards applicable to types of offshore structure is intended to provide a wide latitude in the choice of structural configurations, materials and techniques without hindering innovation. Sound engineering judgement is therefore necessary in the use of these International Standards.

The overall concept of structural integrity is described above. Some additional considerations apply for metocean design and operating conditions. The term “metocean” is short for “meteorological and oceanographic” and refers to the discipline concerned with the establishment of relevant environmental conditions for the design and operation of offshore structures. A major consideration in the design and operation of such a structure is the determination of actions on, and the behaviour of, the structure as a result of winds, waves and currents.

Environmental conditions vary widely around the world. For the majority of offshore locations there are little numerical data from historic conditions; comprehensive data often only start being collected when there is a specific need, for example, when exploration for hydrocarbons is being considered. Despite the usually short duration for which data are available, designers of offshore structures need estimates of extreme and abnormal environmental conditions (with an individual or joint probability of the order of 1×10^{-2}/year and 1×10^{-3} to 1×10^{-4}/year, respectively).

Even for areas like the Gulf of Mexico, offshore Indonesia and the North Sea, where there are over 30 years of fairly reliable measurements available, the data are insufficient for rigorous statistical determination of appropriate extreme and abnormal environmental conditions. The determination of relevant design parameters has therefore to rely on the interpretation of the available data by experts, together with an assessment of any other information, such as prevailing weather systems, ocean wave creation and regional and local bathymetry, coupled with consideration of data from comparable locations. In particular, due account needs to be taken of the uncertainties that arise from the analyses of limited datasets. It is hence important to employ experts from both the metocean and structural communities in the determination of design parameters for offshore structures, particularly since setting of appropriate environmental conditions depends on the chosen option for the offshore structure.

This part of ISO 19901 provides procedures and guidance for the determination of environmental conditions and their relevant parameters. Requirements for the determination of the actions on, and the behaviour of, a structure in these environmental conditions are given in ISO 19901-3, ISO 19901-6, ISO 19901-7, ISO 19902, ISO 19903, ISO 19904-1, ISO 19905-1 and ISO 19906.

Some background to, and guidance on, the use of this part of ISO 19901 is provided in informative Annex A. The clause numbering in Annex A is the same as in the main text to facilitate cross-referencing.

Regional information, where available, is provided in the Regional Annexes B to I. This information has been developed by experts from the region or country concerned to supplement the guidance provided in this part of ISO 19901. Each Regional Annex provides regional or national data on environmental conditions for the area concerned.

Oil and gas industries including lower carbon energy — Specific requirements for offshore structures —

Part 1: Metocean design and operating considerations

1 Scope

This part of ISO 19901 gives general requirements for the determination and use of meteorological and oceanographic (metocean) conditions for the design, construction and operation of offshore structures of all types used in the petroleum and natural gas industries.

The requirements are divided into two broad types:

— those that relate to the determination of environmental conditions in general, together with the metocean parameters that are required to adequately describe them;

— those that relate to the characterization and use of metocean parameters for the design, the construction activities or the operation of offshore structures.

The environmental conditions and metocean parameters discussed are:

— extreme and abnormal values of metocean parameters that recur with given return periods that are considerably longer than the design service life of the structure,

— long-term distributions of metocean parameters, in the form of cumulative, conditional, marginal or joint statistics of metocean parameters, and

— normal environmental conditions that are expected to occur frequently during the design service life of the structure.

Metocean parameters are applicable to:

— the determination of actions for the design of new structures,

— the determination of actions for the assessment of existing structures,

— the site-specific assessment of mobile offshore units,

— the determination of limiting environmental conditions, weather windows, actions and action effects for pre-service and post-service situations (i.e. fabrication, transportation and installation or decommissioning and removal of a structure), and

— the operation of the platform, where appropriate.

NOTE Specific metocean requirements for site-specific assessment of jack-ups are contained in ISO 19905-1, for arctic offshore structures in ISO 19906 and for topside structures in ISO 19901-3.

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

ISO 19901 (all parts), *Oil and gas industries including lower carbon energy — Specific requirements for offshore structures*

ISO 19902, *Petroleum and natural gas industries — Fixed steel offshore structures*

ISO 19903, *Petroleum and natural gas industries — Concrete offshore structures*

ISO 19904-1, *Petroleum and natural gas industries — Floating offshore structures — Part 1: Ship-shaped, semi-submersible, spar and shallow-draught cylindrical structures*

ISO 19905-1, *Oil and gas industries including lower carbon energy — Site-specific assessment of mobile offshore units — Part 1: Jack-ups: elevated at a site*

ISO 19906, *Petroleum and natural gas industries — Arctic offshore structures*

WMO-No 306, *Manual on Codes*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 19900 and the following apply.

3.1
abnormal value
design value of a parameter of abnormal severity used in accidental limit state checks in which a structure is intended not to suffer complete loss of integrity

Note 1 to entry: Abnormal events are typically accidental and environmental (including seismic) events having probabilities of exceedance of the order of 10^{-3} to 10^{-4} per annum.

3.2
chart datum
local datum used to fix water depths on a chart or tidal heights over an area

Note 1 to entry: Chart datum is usually an approximation to the level of the lowest astronomical tide.

Note 2 to entry: Chart datum may differ from one chart to another and care is required if cross referencing sites that are not on the same chart.

3.3
conditional probability
conditional distribution
statistical distribution (probability) of the occurrence of a variable *A*, given that other variables *B*, *C*, … have certain assigned values

Note 1 to entry: The conditional probability of *A* given that *B*, *C*, … occur is written as $P(A|B,C,...)$. The concept is applicable to metocean parameters, as well as to actions and action effects.

EXAMPLE When considering wave parameters, *A* may be the individual crest elevation, *B* the water depth and *C* the significant wave height, and so on.

3.4
design crest elevation
extreme crest elevation measured relative to still water level

Note 1 to entry: The design crest elevation is used in combination with information on astronomical tide, storm surge, platform settlement, reservoir subsidence and water depth uncertainty and is derived using extreme value analysis. Where simplified models are used to estimate the kinematics of the design wave, the design crest elevation may be different from (usually somewhat greater than) the crest elevation of the design wave used to calculate actions on the structure. In reality, the wave with the greatest trough-to-crest height and the wave with the highest crest will be different waves.

3.5
design wave
deterministic wave used for the design of an offshore structure

Note 1 to entry: The design wave is an engineering abstraction. Most often it is a periodic wave with suitable characteristics (e.g. height H, period T, steepness, crest elevation). The choice of a design wave depends on:

— the design purpose(s) considered,

— the wave environment,

— the geometry of the structure,

— the type of action(s) or action effect(s) pursued.

Note 2 to entry: Normally, a design wave is only compatible with design situations in which the action effect(s) are quasi-statically related to the associated wave actions on the structure.

3.6
expert
<metocean> individual who through training and experience is competent to provide metocean advice specific to the area or topic in question.

3.7
extreme water level
EWL
combination of design crest elevation, astronomical tide and storm surge referenced to either LAT or MSL

3.8
extreme value
representative value of a parameter used in ultimate limit state checks

Note 1 to entry: Extreme events have probabilities of the order of 10^{-2} per annum.

3.9
gravity wave
wave in a fluid or in the interface between two fluids for which the predominant restoring forces are gravity and buoyancy

Note 1 to entry: Wind-generated surface waves are an example of gravity waves.

3.10
gust
brief rise and fall in wind speed lasting less than 1 min

Note 1 to entry: In some countries, gusts are reported in meteorological observations if the maximum wind speed exceeds approximately 8 m/s.

3.11
gust wind speed
maximum value of the wind speed of a gust averaged over a short (3 s to 60 s) specified duration within a longer (1 min to 1 h) specified duration

Note 1 to entry: For design purposes, the specified duration depends on the dimensions and natural period of (part of) the structure being designed such that the structure is designed for the most onerous conditions; thus, a small part of a structure is designed for a shorter gust wind speed duration (and hence a higher gust wind speed) than a larger (part of a) structure.

Note 2 to entry: The elevation of the measured gust should also be specified.

3.12
highest astronomical tide
HAT
level of high tide when all harmonic components causing the tides are in phase

Note 1 to entry: The harmonic components are in phase approximately once every 19 years, but these conditions are approached several times each year.

3.13
hindcasting
method of simulating historical (metocean) data for a region through numerical modelling

3.14
infra-gravity wave
surface gravity wave with a period in the range of approximately 25 s to 500 s

Note 1 to entry: In principle an infra-gravity wave is generated by different physical processes but is most commonly associated with waves generated by nonlinear second-order difference frequency interactions between different swell wave components.

3.15
internal wave
gravity wave which propagates within a stratified water column

3.16
Joint North Sea Project Spectrum
JONSWAP
version of the Pierson-Moskowitz spectrum which accounts for the continued development of the spectrum through non-linear wave-wave interaction over time and space

3.17
long-term distribution
probability distribution of a variable over a long time scale

Note 1 to entry: The time scale exceeds the duration of a sea-state, in which the statistics are assumed constant (see 3.35 **short-term distribution**). The time scale is hence comparable to a season or to the design service life of a structure.

EXAMPLE Long-term distributions of:

— significant wave height (based on, for example, storm peaks or all sea-states),

— significant wave height in the months May to September,

— individual wave heights,

— current speeds (such as for use in assessing vortex-induced vibrations of drilling risers),

— scatter diagrams with the joint distribution of significant wave height and wave period (such as for use in a fatigue analysis),

— a particular action effect,

— sea ice types and thickness,

— iceberg mass and velocity,

— storm maximum significant wave height.