



ISO 19901-1

Specific requirements for offshore structures —

Part 1: Metocean design and operating considerations

Exigences spécifiques relatives aux structures en mer —

Partie 1: Dispositions océano-météorologiques pour la conception et l'exploitation

Third edition
2026-08

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Published in Switzerland

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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, *Oil and gas industries including lower carbon energy*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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

The main changes are as follows:

- clarification on the role of the metocean expert ([5.2](#) and [A.5.2](#));
- additional information related to the determination of associated criteria ([5.3](#) and [A.5.3](#));
- additional information related to the estimation of extreme or abnormal conditions ([5.7](#) and [A.5.7](#));
- alignment of the content related to wind with API RP 2MET ([Clause 7](#) and [Clause A.7](#));
- additional information related to breaking or non-breaking wave kinematic estimation ([8.4.3](#) and [A.8.4.3](#));
- expansion of the content related to additional environment factors to be considered ([Clause 10](#) and [Clause A.10](#));
- introduction of text related to the verification of weather forecast information ([Clause 12](#) and [Clause 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](#));

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- re-introduction of US Gulf of Mexico regional annex ([Annex J](#));
- re-introduction of coast of California regional annex ([Annex K](#));
- re-introduction of the overview annex of regions excluding Gulf of Mexico and California ([Annex L](#)).

A list of all parts in the ISO 19901 series can be found on the ISO website.

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The International Standards on offshore structures prepared by TC 67 (i.e. ISO 19900, the ISO 19901 series, ISO 19902, ISO 19903, ISO 19904-1, the ISO 19905 series, ISO 19906) constitute a common basis covering those aspects that address design requirements and assessments of all offshore structures used by the oil and gas industries including lower carbon energy 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 can disturb the balance of reliability inherent in the overall concept or structural system. The implications involved in modifications, therefore, should be considered in relation to the overall reliability of all offshore structural systems.

The International Standards on offshore structures prepared by TC 67 are 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.

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 40 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 should 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.

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.

NOTE Specific metocean requirements for site-specific assessment of jack-ups are contained in ISO 19905-1, for arctic offshore structures in ISO 19906, for arctic offshore operations in ISO 35106 and for topside structures in ISO 19901-3.

Some background to, and guidance on, the use of this document is provided in [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 [Annexes B](#) to [L](#). This information has been developed by experts from the region or country concerned to supplement the guidance provided in this document. Each regional annex provides regional or national data on environmental conditions for the area concerned.