



ISO 19901-7

Specific requirements for offshore structures —

**Part 7:
Stationkeeping systems for floating offshore structures and mobile offshore units**

Exigences spécifiques relatives aux structures en mer —

Partie 7: Systèmes de maintien en position des structures en mer flottantes et des unités mobiles en mer

**Third edition
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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 document 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).

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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 19901-7:2013), which has been technically revised.

The main changes are as follows:

- addition of requirements for a mooring integrity management system;
- emphasis on the definition of the operator's expectations on the performance standard;
- inclusion of fibre ropes as a standard material such as chain and steel wire ropes;
- alignment of text relating to the geotechnical design of anchors with ISO 19901-4;
- inclusion of guidance on OPB (out of plane bending) fatigue and squall design cases.

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 offshore structures used by the oil and gas industries worldwide. The intention in their application is to achieve reliability levels appropriate for manned and unmanned offshore structures, irrespective type of structure and the nature or combination of materials used.

It is important to recognize that structural integrity is a concept comprised of models that describe 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 design 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 breadth of choice for structural configurations, materials and techniques without hindering innovation. Informed engineering judgement is therefore necessary in the use of these International Standards.

This document was developed in response to the worldwide offshore industry's demand for a coherent and consistent definition of methodologies to analyse, design and evaluate stationkeeping systems used for floating energy production platforms (with and without storage) of various types (e.g. semi-submersibles, spar platforms, ship-shaped structures) and to assess site-specific applications of mobile offshore units (such as mobile offshore drilling units and flotels) and construction units (such as heavy lift vessels and pipelay units).

This document assumes that permanently moored hydrocarbon production systems that are equipped with stationkeeping systems as a minimum have the ability to both shut-in wells and the facility in case of emergency (e.g. emergency shut-down valves on the seabed), otherwise the consequence of mooring failure can be significantly different.

Stationkeeping is a generic term covering systems for keeping a floating structure, which is under the constant influence of external actions, either at a pre-defined location or at a pre-defined heading or both with limited excursions. Stationkeeping systems resist external actions by means of any of the following:

- mooring systems (e.g. spread mooring systems or single point mooring systems);
- dynamic positioning systems (generally consisting of thrusters)
- a combination of mooring system and thrusters (thruster assisted mooring systems).

The external actions generally consist of wind, wave, current and ice actions on the floating structure, mooring and risers.

The procedures for the design of permanent or site-specific assessment of mobile mooring systems specified in this document are based on a deterministic approach where mooring system responses (such as line tensions, vessel offsets, and anchor loads) are evaluated for a design environment defined by an annual probability of exceedance or return period. Mooring system responses are then checked against specified requirements for mooring strength, offsets and orientation, clearances, anchor capacity, fatigue resistance, etc. The minimum specified requirements are defined either in this document or by the operator if more stringent.

NOTE Stationkeeping systems designed based on this deterministic approach can have differing levels of reliability.

For moored structures (vessels), system responses are calculated and compared to minimum specified requirements for:

- Ultimate limit states (ULS): mooring component strength. Vessel offset, orientation, and clearance constraints. Herein the ULS includes both intact and single failure condition for stationkeeping systems.

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infrastructure, exclusion zones, etc.

- Fatigue limit states (FLS) : cumulative mooring component fatigue damage.
- Accidental and abnormal limit state (ALS): no criteria are given for accidental or abnormal limit state which are left to operator decision or local authorities requirements.

The methodology described in this document identifies a set of coherent analysis techniques that, combined with an understanding of the site-specific metocean conditions, the characteristics of the floating structure under consideration, and other factors, can be used to determine the adequacy of the stationkeeping system to meet the functional requirements specified in this document.

Descriptions of characteristics and typical components found in these systems are given in [Annex A](#).

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 [Annex B](#).