# Petroleum and natural gas industries - Fixed steel offshore structures

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## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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|---|---|
| Käesolev Eesti standard EVS-EN ISO 19902:2008 sisaldab Euroopa standardi EN ISO 19902:2007 ingliskeelset teksti. | This Estonian standard EVS-EN ISO 19902:2008 consists of the English text of the European standard EN ISO 19902:2007. |
| Standard on kinnitatud Eesti Standardikeskuse 28.01.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas. | This standard is ratified with the order of Estonian Centre for Standardisation dated 28.01.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation. |
| Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 05.12.2007. | Date of Availability of the European standard text 05.12.2007. |
| Standard on kättesaadav Eesti standardiorganisatsioonist. | The standard is available from Estonian standardisation organisation. |



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# Petroleum and natural gas industries - Fixed steel offshore structures (ISO 19902:2007)

Industries du pétrole et du gaz naturel - Structures en mer fixes en acier (ISO 19902:2007)

Erdöl- und Erdgasindustrie - Gegründete Stahlplattformen (ISO 19902:2007)

This European Standard was approved by CEN on 3 November 2007.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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# Foreword

This document (EN ISO 19902:2007) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 “Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**Endorsement notice**

The text of ISO 19902:2007 has been approved by CEN as a EN ISO 19902:2007 without any modification.

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# 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 can 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 the various types of offshore structure is intended to provide wide latitude in the choice of structural configurations, materials and techniques without hindering innovation. Sound engineering judgment is therefore necessary in the use of these International Standards.

Annex A provides background to and guidance on the use of this document and needs to be read in conjunction with the main body of this document. The clause numbering in Annex A is the same as in the normative text to facilitate cross-referencing.

Materials, welding and weld inspection requirements can be based either on a “material category” or on a “design class” approach, as discussed in Clauses 19 and 20. If the material category approach is used, the corresponding provisions of Annexes C and E are normative; if the design class approach is used, the corresponding provisions of Annexes D and F are normative.

Annex G gives requirements on fabrication tolerances.

Regional information on the application of the document to certain specific offshore areas is provided in informative Annex H.

To meet certain needs of industry for linking software to specific elements in this International Standard, a special numbering system has been permitted for figures, tables, equations and bibliographic references.

# Petroleum and natural gas industries — Fixed steel offshore structures



## 1 Scope

This International Standard specifies requirements and provides recommendations applicable to the following types of fixed steel offshore structures for the petroleum and natural gas industries:

— caissons, free-standing and braced;

— jackets;

— monotowers;

— towers.

In addition, it is applicable to compliant bottom founded structures, steel gravity structures, jack-ups, other bottom founded structures and other structures related to offshore structures (such as underwater oil storage tanks, bridges and connecting structures), to the extent to which its requirements are relevant.

This International Standard contains requirements for planning and engineering of the following tasks:

a) design, fabrication, transportation and installation of new structures as well as their future removal;

b) in-service inspection and integrity management of both new and existing structures;

c) assessment of existing structures;

d) evaluation of structures for reuse at different locations.

NOTE 1 Specific additional requirements for the design of fixed steel offshore structures in arctic environments are to be contained in ISO 19906[1].

NOTE 2 Requirements for topsides structures are to be contained in ISO 19901-3[2], for marine operations in ISO 19901-6[3] and for the site-specific assessment of jack-ups in ISO 19905-1[4].

## 2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 10414-1, *Petroleum and natural gas industries — Field testing of drilling fluids — Part 1: Water-based fluids*

ISO 12135, *Metallic materials — Unified method of test for the determination of quasistatic fracture toughness*

ISO 13702, *Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines*

ISO 19900:2002, *Petroleum and natural gas industries — General requirements for offshore structures*

ISO 19901-1:2005, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 1: Metocean design and operating considerations*

ISO 19901-2, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 2: Seismic design procedures and criteria*

ISO 19901-4, *Petroleum and natural gas industries — Specific requirements for offshore structures — Part 4: Geotechnical and foundation design considerations*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19900, ISO 19901-1, ISO 19901-2 and ISO 19901-4, and the following apply.

**3.1**
**abnormal value**
value of a parameter of abnormal severity used in accidental limit state checks in which a structure should not suffer complete loss of integrity

NOTE 1 Abnormal design situations are used to provide robustness against events with a probability of exceedance of typically between $10^{-3}$ and $10^{-4}$ per annum by avoiding, for example, gross overloading.

NOTE 2 Abnormal values and events have probabilities of exceedance of the order of $10^{-3}$ to $10^{-4}$ per annum. In the limit state checks, some or all of the partial factors are set to 1,0.

NOTE 3 Adapted from ISO 19901-1:2005, definition 3.1.

**3.2**
**accidental design situation**
design situation involving exceptional conditions of the structure or its exposure

EXAMPLE Impact, fire, explosion, local failure, loss of intended differential pressure (e.g. buoyancy).

**3.3**
**after damage design situation**
design situation for which the condition of the structure reflects damage due to an accidental design situation and for which the environmental conditions are specially defined

**3.4**
**analysis type**
method including governing equations for deriving action effects

EXAMPLE Static analysis, transient dynamic analysis, non-linear analysis.

**3.5**
**basic variable**
one of a specified set of variables representing physical quantities which characterize actions, environmental influences, geometrical quantities, or material properties including soil properties

[ISO 19900:2002]

**3.6**
**boundary conditions**
actions and constraints on a [section of a] structural component [or a group of structural components] by other structural components or by the environment surrounding it

NOTE Boundary conditions can be used to generate reaction forces at locations of restraint.