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## Petroleum and natural gas industries — Specific requirements for offshore structures —

### Part 5: Weight control during engineering and construction

*Industries du pétrole et du gaz naturel — Exigences spécifiques relatives aux structures en mer —  
Partie 5: Contrôle des poids durant la conception et la fabrication*

[Revision of first edition (ISO 19901-5:2003)]

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**PREVIEW**  
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#### ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 19901-5 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 second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

ISO 19901 consists of the following parts, under the general title *Petroleum and natural gas industries — Specific requirements for offshore structures*:

- Part 5: *Weight control during engineering and construction*
- Part [n]:
- Part [n+1]:

## Introduction

The offshore structures International Standards ISO 19900 to 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 type of structure and the nature 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 offshore structures International Standards 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.

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# Petroleum and natural gas industries — Specific requirements for offshore structures — Part 5: Weight control during engineering and construction

## 1 Scope

This part of ISO 19901 specifies requirements for controlling the weight and centre of gravity (CoG) by means of mass management during the engineering and construction of structures for the offshore environment. The provisions are applicable to offshore projects that include structures of all types (fixed and floating) and materials. These structures can be complete new installations or the modifications to existing installations. Maintaining the weight control of existing installations is not part of the ISO main standards, but some guidance on this is included in the Annex G.

This part of ISO 19901:

- specifies quality requirements for reporting of weights and centres of gravity;
- specifies requirements for weight reporting;
- provides a basis for overall project weight reports or management reports for all weight control classes;
- specifies requirements for weight and load budgets;
- specifies the methods and requirements for the weighing and the determination of weight and centre of CoG of major assemblies;
- specifies requirements for weight information from suppliers, including weighing of equipment and bulk materials for offshore installations;

and may be used

- as a basis for planning, evaluating and presenting the client's, contractor's or fabricator's weight management and reporting system;
- as a means of refining the structural analysis or model;
- as a contract reference between client, contractor and suppliers;
- as a basis for costing, scheduling or determining suitable fabrication method(s) or location(s).

## 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 ab-c:199x, *General title of series of parts — Part c: Title of part*

ISO xyz (all parts), *General title of the series of parts*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

- 3.1 assembly**  
designed and fabricated group of bulk and equipment items which form one unit
- 3.2 budget weight**  
weight reference figures as defined in the weight and load budget and related to the initial or changed design concept
- 3.3 bulk**  
component or arrangement of components defined as stock materials or of low complexity
- Note 1 to entry: Bulk items support the equipment items by providing infrastructure around and between them.
- 3.4 centre of gravity (CoG)**  
the average location of the weight of an item. For assemblies, modules or topsides the aggregate CoG is the mathematical weighted average of the CoG's of the individual items (comprising the completed assembly, module or topsides) measured from a common reference point
- 3.5 client weight reserve**  
weight addition (usually a lump sum weight) controlled by the client and used to account for any orders for variation to the contractual design concept
- 3.6 CoG envelope**  
defined constraint volume within which the centre of gravity (CoG) of an assembly shall remain
- 3.7 consumables**  
variable content that do not remain at a constant level due to consumption during the operation of an offshore installation
- EXAMPLES Potable/service water, diesel fuel, crew provisions, bulk drilling powders for creation of mud and/or cement.
- 3.8 contents**  
fluids or bulk powders held within bulks (piping or structural tanks) or equipment at their normal operating levels. Typical contents are hydrocarbons, cooling and heating mediums, chemicals, fuels, condensates, seawater, fresh water, dry powders (drilling cement and mud additives), dry stores for workshops, sack stores, etc. Fluids that are expected to be continuously installed in an item of equipment (e.g. coolants and lubricating oils) are not to be considered as contents. See dry weight for further explanation
- 3.9 contractor weight reserve**  
additional weight (either a lump sum weight or percentage of a total weight) at a specified CoG, controlled by the contractor and used to account for any design growth within their control

**3.10****deadweight**

total carrying capacity of a floating structure, ref. Annex D

Note 1 to entry: Includes weight of crude oil, deck cargo, temporaries, water, snow and ice accumulations, marine growth, ballast water, consumables, crew and their effects.

**3.11****discipline**

a branch of knowledge reflecting a single aspect in the project

EXAMPLES Architectural, drilling, electrical, HVAC, instrumentation, loss control (Safety), piping, structural and telecommunications.

**3.12****discipline check list**

a document detailing the weight items that are within the discipline's control

**3.13****displacement**

weight of the volume of water displaced by a floating structure

Note 1 to entry: The sum of lightweight and deadweight including mooring system load, appendences and/ or appurtenances e.g. structures outside the moulded hull. See Annex D.

**3.14****dry weight**

weight of a component, weight item or an assembly in its dry installed condition including permanent utilities

Note 1 to entry: Examples of permanent utilities are gearbox oil, hydraulic oil, filter sand, etc.

Note 2 to entry: Any content of operating fluid flowing through a component, weight item or an assembly is excluded.

**3.15****equipment**

component or arrangement of components, built for specific function(s)

Note 1 to entry: The component/assembly normally has unique documentation due to its function and complexity.

**3.16****estimated weight**

weight determined based on previous experience

**3.17****first fill**

initial filling of contents in items of equipment or piping prior to start of operation of an offshore facility

Note 1 to entry: First fill typically takes place towards the end of site construction, prior to tow-out and prior to filling for normal operations.

**3.18****float-out**

loading condition in which a major assembly is transferred from a dry construction site to become self-floating

**3.19****future weight**

weight of a component or an assembly to be installed after the start of production

**3.20  
grillage**

steel structure, secured to the deck of a barge or vessel, designed to support the cargo and distribute the loads between the cargo and the barge or vessel

**3.21  
gross weight**

sum of the net weight and weight allowances

**3.22  
hook-up**

installation of components or assemblies after the modules have been installed in their final position, to connect to the existing installation

**3.23  
hook weight**

sum of lifting weight and lifting gear weight

**3.24  
initial operating (loading condition)**

a load condition for an operating offshore facility defined at the start of steady-state production. All bulk and equipment items are present with contents at nominal operating levels

**3.25  
lifting gear**

equipment needed during a lifting operation

EXAMPLE Slings, spreader bars, lifting frames, shackles, etc.

**3.26  
lifting weight**

weight of a component, an assembly or a module at padeyes, including temporaries and residual fluid content but excluding lifting gear

**3.27  
lightship weight**

dry and invariable weight of a floating unit (incl. minimum utility content to secure a safe condition, ref Annex D)

**3.28  
loading condition**

defined event for which a weight and CoG need to be controlled

Note 1 to entry: For each loading condition, all weight items and variable loads that are known or predicted to occur are identified, quantified and located.

Note 2 to entry: Typical loading conditions are dry installed offshore, float-out at assembly site, future operating installed offshore, initial operating installed offshore, load-out to offshore transport vessel, transport to offshore field, etc.

**3.29  
load-out**

the transfer - by way of horizontal movement - of an assembly, module or topsides from its land-based fabrication site onto a floating or grounded transport barge or vessel

Note 1 to entry: The following are typical load-out operations:

- skidded: load-out using a combination of skid-ways, skid-shoes or runners, propelled by towing engines, jacks or winches;

— trailer: load-out using multi-axle trailers (SPMT's – self-propelled modular transporter).

### 3.30

#### **master equipment list (MEL)**

a project specific database for control and management of technical data for tagged equipment

### 3.31

#### **mating**

transfer of a major assembly supported on barge(s) or vessel(s) to a temporary or permanent support structure

### 3.32

#### **module**

a major assembly of items forming a major building block which need to be controlled with respect to weight and CoG

### 3.33

#### **net weight**

the calculated or estimated weight of an item excluding allowances

### 3.34

#### **not-to-exceed weight/NTE weight**

maximum acceptable weight for any given loading condition, with an associated limiting CoG envelope

### 3.35

#### **operating weight**

sum of the dry weight and the content weight

### 3.36

#### **project management**

with respect to weight management, management personnel tasked with implementing weight policy, objectives and procedures

### 3.37

#### **residual content**

content in bulks and equipment remaining after testing or commissioning, and being present during the subsequent loading conditions up to the start of production

### 3.38

#### **sea fastening**

items used for temporary fastening to keep all items in position during transportation at sea

### 3.39

#### **tagged equipment**

equipment identified and labelled in accordance with the project coding manual and tracked in MEL

### 3.40

#### **temporary item or temporaries**

items temporarily installed during a loading condition and removed afterwards. Temporaries do not form part of a structure's permanent dry or operating weight

### 3.41

#### **test weight**

sum of the dry weight plus the content required to test the equipment or assembly

### 3.42

#### **tow-out**

towing of a complete floating structure to the offshore installation site