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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: Contrôles des poids durant la conception et la fabrication*



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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*.

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

- *Part 4: Geotechnical and foundation design considerations*
- *Part 5: Weight control during engineering and construction*

The following parts of ISO 19901 are under preparation:

- *Part 1: Metocean design and operating considerations*
- *Part 2: Seismic design procedures and criteria*
- *Part 3: Topsides structure*
- *Part 6: Marine operations*
- *Part 7: Stationkeeping systems for floating offshore structures and mobile offshore units*

ISO 19901 is part of a series of standards for offshore structures. The full series consists of the following standards:

- ISO 19900, *Petroleum and natural gas industries — General requirements for offshore structures*
- ISO 19901 (all parts), *Petroleum and natural gas industries — Specific requirements for offshore structures*
- ISO 19902, *Petroleum and natural gas industries — Fixed steel offshore structures*
- ISO 19903, *Petroleum and natural gas industries — Fixed concrete offshore structures*
- ISO 19904, *Petroleum and natural gas industries — Floating offshore structures*

- ISO 19905-1, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 1: Jack-ups*
- ISO/TR 19905-2, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 2: Jack-ups commentary*
- ISO 19906, *Petroleum and natural gas industries — Arctic offshore structures*

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## 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 and materials.

This part of ISO 19901 differentiates between projects where considerations with regard to weight and CoG have a high priority as a result of weight and/or CoG sensitivity, and projects where weight and CoG are of little consequence. This differentiation has been made by the introduction of three different classes of structure (Class A, Class B and Class C). Depending on the degree of control necessary, different clauses of this part of ISO 19901 will apply; Clause 4 provides guidelines for assigning one of these classes.

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 status reports or management reports for all classes,
- specifies requirements for weight and load budgets for offshore installations,
- specifies the methods and requirements for the weighing of major assemblies, and the determination of weight and centre of gravity,
- 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 and presentation of the contractor's weight-reporting system;
- as a basis for evaluation of the contractor's weight-reporting system;
- as a means of refining the structural analysis/model;
- as a contract reference between the ordering client and the contractor;
- as a basis for costing.

## 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.

*Guide to the expression of uncertainty in measurement (GUM)*, BIPM, IEC, IFCC, ISO, IUPAC, IUPAP and OIML

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

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

#### 3.1.1

##### **assembly**

designed and fabricated group of bulk and equipment items which form one unit

#### 3.1.2

##### **ballast**

variable solid or fluid content used to trim a floating structure and/or keep a certain draft

#### 3.1.3

##### **base weight estimate**

weight estimate used for budgeting purposes which does not include any unforeseen quantity growth, estimating errors or unnamed events

#### 3.1.4

##### **base weight contingency**

weight addition, based on risk analysis or experience, used to transform a base weight estimate into a 50/50 weight estimate accounting for uncertainties

#### 3.1.5

##### **budget weight**

weight reference figures as defined in the weight and load budget and related to the initial or changed design concept

#### 3.1.6

##### **bulk**

component or arrangement of components defined as stock materials or of low complexity

#### NOTE

Bulk items support the equipment items by providing infrastructure around and between them.

#### 3.1.7

##### **client weight reserve**

weight addition with CoG (usually a fixed weight) controlled by the client and used to cater for any orders for variation to the contractual design concept

#### 3.1.8

##### **CoG envelope**

defined constraint volume within which the CoG of an assembly must remain for design purposes

#### 3.1.9

##### **consumables**

variable content, which is solid in stores and fluid in utility tanks

#### EXAMPLES

Fuel, provisions, service/potable water, operating utilities.