

**BS EN ISO 19901-5:2016**



**BSI Standards Publication**

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

Part 5: Weight control during engineering and construction (ISO 19901-5:2016)

**bsi.**

This is a preview. [Click here to purchase the full publication.](#)

**National foreword**

This British Standard is the UK implementation of EN ISO 19901-5:2016. It supersedes BS EN ISO 19901-5:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/525/12, Design of offshore structures.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.  
Published by BSI Standards Limited 2016

ISBN 978 0 580 84453 9

ICS 75.180.10

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2016.

**Amendments/corrigenda issued since publication**

Date	Text affected
------	---------------

---

English Version

**Petroleum and natural gas industries - Specific  
requirements for offshore structures - Part 5: Weight  
control during engineering and construction (ISO 19901-  
5:2016)**

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 (ISO 19901-5:2016)

Erdöl- und Erdgasindustrie - Besondere  
Anforderungen an Offshore-Bauwerke - Teil 5:  
Gewichtskontrolle während der Auslegung und  
Konstruktion (ISO 19901-5:2016)

This European Standard was approved by CEN on 30 January 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## European foreword

This document (EN ISO 19901-5:2016) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum, petrochemical 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 NEN.

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 September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

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.

This document supersedes EN ISO 19901-5:2003.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 19901-5:2016 has been approved by CEN as EN ISO 19901-5:2016 without any modification.

# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>0 Introduction</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>2</b>
<b>4 Abbreviated terms</b>	<b>8</b>
<b>5 Weight control classes</b>	<b>8</b>
5.1 General	8
5.2 Class A: High definition of weight and CoG	8
5.3 Class B: Medium definition of weight and CoG	8
5.4 Class C: Low definition of weight and CoG	9
5.5 Selection of class of weight control	9
<b>6 Weight and load budget (WLB)</b>	<b>10</b>
6.1 General	10
6.2 Requirements	11
6.3 Content	11
6.3.1 General	11
6.3.2 Weight reserves	12
6.3.3 Future weights and loads	13
6.3.4 Loading conditions and parameters	13
6.3.5 Formats and levels	14
6.3.6 CoG envelopes	14
<b>7 Weight control procedure</b>	<b>15</b>
<b>8 Weight reporting</b>	<b>16</b>
8.1 General	16
8.2 Weight report requirements	17
<b>9 Requirements for suppliers' weight data and weighing of equipment and bulks</b>	<b>20</b>
9.1 General	20
9.2 Provision of weight information	20
9.3 Weighing requirements	20
9.4 Weighing equipment	21
9.5 Weighing procedure	21
9.6 Notification and witnessing of weighing	22
9.7 Calibration of weighing equipment	22
9.8 Weighing operation	22
9.9 Temporaries during weighing	23
9.10 Items not installed during weighing	23
<b>10 Requirements for weighing of major assemblies</b>	<b>23</b>
10.1 Weighing procedure	23
10.2 Environmental conditions	23
10.2.1 Light	23
10.2.2 Wind	24
10.2.3 Temperature and humidity	24
10.3 Weighing	25
10.3.1 Number and timing of weighing	25
10.3.2 Weighing procedure	25
10.3.3 Notification and witnessing of weighings	26
10.3.4 Preparation of the weighing	26
10.3.5 Weighing equipment	27
10.3.6 Calibration of weighing system	30

10.3.7	Weighing foundation and supports .....	30
10.3.8	Structural integrity .....	31
10.3.9	Weighing operation .....	31
10.3.10	CoG calculations .....	32
10.3.11	Weighing certificate .....	33
10.3.12	Weighing report .....	33
<b>11</b>	<b>Requirements for “as-built” weight documentation .....</b>	<b>34</b>
<b>Annex A</b> (informative)	<b>Weight data sheets — Tagged equipment .....</b>	<b>35</b>
<b>Annex B</b> (informative)	<b>Weighing certificates .....</b>	<b>37</b>
<b>Annex C</b> (informative)	<b>Weight and load budget (WLB) formats and levels .....</b>	<b>41</b>
<b>Annex D</b> (informative)	<b>Major elements of the weight displacement .....</b>	<b>42</b>
<b>Annex E</b> (informative)	<b>Supplier weighing procedure .....</b>	<b>43</b>
<b>Annex F</b> (informative)	<b>Guidelines for displacement measurement of floaters .....</b>	<b>45</b>
<b>Annex G</b> (informative)	<b>Requirements for weight control during operations .....</b>	<b>49</b>
<b>Annex H</b> (informative)	<b>Requirements for topside weight estimation — New builds/green field .....</b>	<b>65</b>
<b>Annex I</b> (informative)	<b>Executive summary description .....</b>	<b>70</b>
<b>Annex J</b> (informative)	<b>Weighing result uncertainty .....</b>	<b>72</b>
<b>Annex K</b> (informative)	<b>Weight control database structure .....</b>	<b>73</b>
<b>Bibliography</b> .....		<b>75</b>

## 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.

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 documents 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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 7, *Offshore structures*.

This second edition cancels and replaces the first edition (ISO 19901-5:2003), which has 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 1: Metocean design and operating considerations*
- *Part 2: Seismic design procedures and criteria*
- *Part 3: Topsides structure*
- *Part 4: Geotechnical and foundation design considerations*
- *Part 5: Weight control during engineering and construction*
- *Part 6: Marine operations*
- *Part 7: Stationkeeping systems for floating offshore structures and mobile offshore units*
- *Part 8: Marine soil investigations*

The following parts are under preparation:

- *Part 9: Structural integrity management*

## 0 Introduction

### 0.1 General

The International Standards ISO 19900 to ISO 19906 relating to offshore structures 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.

ISO 19900 to ISO 19906 relating to offshore structures 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.

### 0.2 Preface

It is proposed to canvass the TC 67/SC 7 member countries to widen the scope of this part of ISO 19901 for the third edition. As a consequence, the title might change.

- It is proposed to expand and re-structure this part of ISO 19901 to more comprehensively address topside weight engineering principles, roles, responsibilities and objectives for a complete platform life cycle.
- It is proposed to re-format into a more traditional ISO document layout.
- The use of weight class A, B and C tables will be reviewed.
- There will be an outline of how to control topside weight, and of the aims and expectations of a Weight Review Panel (or similar).
- A common topside operating philosophy will be included with a matrix of coincident drilling loads, operating loads, and laydown / storage loads to be included in topside weight databases.
- It is proposed to give guidance on applied design contractor allowances during detailed design, plus the use of client operational and management reserves.
- The weight and CoG accuracy expected from weighings will be addressed.
- Separate clauses will be added to give clarity to specific requirements of floating structures and jackets
- The contents and terminology will be coordinated to interface with ISO 19902, *Design of offshore structures*, and the forthcoming ISO19901-9, *Structural integrity management* (due to be published in 2017).

It is proposed to give more guidance on a range of topics encountered during the phases of a platform life cycle, typically:

- a) Weight control principles
  - Overview of principles, aims and objectives
  - Roles and responsibilities
  - Competency



- Software selection
- Deliverables for each project phase
- Weight report contents
- b) Floating structures and jackets
  - Specific requirements for floating structures
- c) Concept and feasibility phase
  - Use of historical volumetric weight norms
  - Use of area based weight calculations
  - Use of footprint ratios
- d) Front end engineering design phase
  - Design parameters to be fixed prior to setting Not-to-Exceed weights
- e) Detailed design phase
  - Control of weight using a Weight Review Panel or similar
  - Use of contractor allowances
  - Use of client reserves
  - Discipline reporting responsibilities
  - Coincident operating loads
  - Coincident drilling loads
  - Coincident laydown and storage loads
  - Laydown and storage drawings and area signage
  - Vendor weighing requirements
- f) Fabrication phase
  - Fabricator responsibilities
  - Reporting of site run materials
  - Weighing requirements
  - Preparations for weighing
  - Expected weight and CoG accuracy from weighings
  - Predictions and witnessing of weighings
  - Post-weighing reconciliation and weighing corrections
- g) Installation and hook-up phase
  - Reporting of hook-up weights
- h) Operational phase
  - Control of weight and CoG for topside modifications

Interfaces with ISO 19901-9 and ISO 19902

i) Decommissioning phase

Preparations for decommissioning

Some of the above proposed changes are outlined in Annex G of this document (informative).

It is proposed that preparation of the third edition of this part of ISO 19901 will begin immediately after the issue of this edition with a target publication date of 2017.