



NSAI
Standards

Irish Standard
I.S. EN ISO 19905-1:2016

Petroleum and natural gas industries - Site-specific assessment of mobile offshore units - Part 1: Jack-ups (ISO 19905-1:2016)

I.S. EN ISO 19905-1:2016

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN ISO 19905-1:2016

Published:

2016-02-24

This document was published under the authority of the NSAI and comes into effect on:

2016-03-14

ICS number:

75.180.10

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN ISO 19905-1:2016 is the adopted Irish version of the European Document EN ISO 19905-1:2016, Petroleum and natural gas industries - Site-specific assessment of mobile offshore units - Part 1: Jack-ups (ISO 19905-1:2016)

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

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

EN ISO 19905-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2016

ICS 75.180.10

Supersedes EN ISO 19905-1:2012

English Version

**Petroleum and natural gas industries - Site-specific
assessment of mobile offshore units - Part 1: Jack-ups (ISO
19905-1:2016)**

Industries du pétrole et du gaz naturel - Évaluation
spécifique au site d'unités mobiles en mer - Partie 1:
Plates-formes auto-élévatrices (ISO 19905-1:2016)

Erdöl- und Erdgasindustrie - Beurteilung von mobilen
Offshore Einheiten bezüglich ihres Einsatzgebietes -
Teil 1: Hubinseln (ISO 19905-1:2016)

This European Standard was approved by CEN on 2 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

EN ISO 19905-1:2016 (E)

Contents	Page
European Foreword.....	3

European Foreword

This document (EN ISO 19905-1:2016) 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 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 August 2016, and conflicting national standards shall be withdrawn at the latest by August 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 19905-1:2012.

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 19905-1:2016 has been approved by CEN as EN ISO 19905-1:2016 without any modification.

This page is intentionally left blank

**INTERNATIONAL
STANDARD**

**ISO
19905-1**

Second edition
2016-01-15

**Petroleum and natural gas
industries — Site-specific assessment
of mobile offshore units —**

**Part 1:
Jack-ups**

*Industries du pétrole et du gaz naturel — Évaluation spécifique au
site d'unités mobiles en mer —*

Partie 1: Plates-formes auto-élevatrices



Reference number
ISO 19905-1:2016(E)

© ISO 2016

ISO 19905-1:2016(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword.....	v
Introduction	vii
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Symbols and abbreviated terms	13
4.1 Symbols	13
4.2 Abbreviated terms	15
5 Overall considerations	16
5.1 General	16
5.2 Assessment approach	16
5.3 Selection of limit states	19
5.4 Determination of assessment situations	20
5.5 Exposure levels	21
5.6 Analytical tools	25
6 Data to assemble for each site	25
6.1 Applicability	25
6.2 Jack-up data	25
6.3 Site and operational data	25
6.4 Metocean data	26
6.5 Geophysical and geotechnical data	27
6.6 Earthquake data	27
7 Actions	27
7.1 Applicability	27
7.2 General	28
7.3 Metocean actions	28
7.4 Functional actions	29
7.5 Displacement dependent effects	29
7.6 Dynamic effects	29
7.7 Earthquakes	29
7.8 Other actions	29
8 Structural modelling	30
8.1 Applicability	30
8.2 Overall considerations	30
8.3 Modelling the leg	31
8.4 Modelling the hull	31
8.5 Modelling the leg-to-hull connection	32
8.6 Modelling the spudcan and foundation	32
8.7 Mass modelling	33
8.8 Application of actions	34
9 Foundations	37
9.1 Applicability	37
9.2 General	37
9.3 Geotechnical analysis of independent leg foundations	37
9.4 Other considerations	41

ISO 19905-1:2016(E)

10	Structural response	43
10.1	Applicability	43
10.2	General considerations.....	43
10.3	Types of analyses and associated methods.....	43
10.4	Common parameters.....	44
10.5	Storm analysis	46
10.6	Fatigue analysis.....	48
10.7	Earthquake analysis	48
10.8	Accidental situations	49
10.9	Alternative analysis methods	49
11	Long-term applications.....	50
11.1	Applicability	50
11.2	Assessment data.....	50
11.3	Special requirements	51
11.4	Survey requirements.....	51
12	Structural strength.....	52
12.1	Applicability	52
12.2	Classification of member cross-sections.....	53
12.3	Section properties of non-circular prismatic members.....	54
12.4	Effects of axial force on bending moment.....	55
12.5	Strength of tubular members	55
12.6	Strength of non-circular prismatic members.....	55
12.7	Assessment of joints	55
13	Acceptance criteria	55
13.1	Applicability	55
13.2	General formulation of the assessment check	56
13.3	Leg strength assessment	57
13.4	Spudcan strength assessment.....	57
13.5	Holding system strength assessment.....	57
13.6	Hull elevation assessment	58
13.7	Leg length reserve assessment.....	58
13.8	Overturning stability assessment	58
13.9	Foundation integrity assessment.....	59
13.10	Interaction with adjacent infrastructure.....	60
13.11	Temperatures	60
Annex A (informative) Additional information and guidance		61
Annex B (normative) Summary of partial action and partial resistance factors		249
Annex C (informative) Additional information on structural modelling and response analysis		251
Annex D (informative) Foundations — Recommendations for the acquisition of site-specific geotechnical data.....		261
Annex E (informative) Foundations — Additional information and alternative approaches		267
Annex F (informative) Informative annex on Clause A.12 — Structural strength.....		280
Annex G (informative) Contents list for typical site-specific assessment report.....		295
Annex H (informative) Regional information.....		302
Bibliography		311

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).

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).

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 19905-1:2012), which has been technically revised.

ISO 19905 consists of the following parts, under the general title *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units*:

- *Part 1: Jack-ups*
- *Part 2: Jack-ups commentary and detailed sample calculation* [Technical Report]

The following parts are under preparation:

- *Part 3: Floating units*

ISO 19905 is one of a series of International Standards for offshore structures. The full series comprises the following:

- 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 19905-1:2016(E)

- ISO 19902, *Petroleum and natural gas industries — Fixed steel offshore structures*
- ISO 19903, *Petroleum and natural gas industries — Fixed concrete offshore structures*
- ISO 19904-1, *Petroleum and natural gas industries — Floating offshore structures — Part 1: Monohulls, semi-submersibles and spars*
- ISO/TR 19905-2, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 2: Jack-ups commentary and detailed sample calculation*
- ISO 19905-3, *Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 3: Floating units*
- ISO 19906, *Petroleum and natural gas industries — Arctic offshore structures*

Introduction

The series of International Standards applicable to types of offshore structure, ISO 19900 to ISO 19906, addresses design requirements and assessments for 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 or assessment rules, safety elements, workmanship, quality control procedures and national requirements, all of which are mutually dependent. The modification of one aspect of design or assessment 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 offshore structural systems.

The series of International Standards applicable to types of offshore structure is 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.

This part of ISO 19905, which has been developed from the Society of Naval Architects and Marine Engineers (SNAME) Technical & Research Bulletin 5-5A (2002), states the general principles and basic requirements for the site-specific assessment of mobile jack-ups; it is intended to be used for assessment and not for design.

NOTE For the exposure level 1(L1) assessment and, where appropriate, the exposure level 2 (L2) assessment prior to evacuation being effected, this part of ISO 19905 requires the use of 50 year independent or 100 year joint probability metocean extremes, together with associated partial action factors. It is based on extensive benchmarking and best practice in the international community.

Site-specific assessment is normally carried out when an existing jack-up unit is to be installed at a specific site. The assessment is not intended to provide a full evaluation of the jack-up; it assumes that aspects not addressed herein have been addressed using other practices and standards at the design stage. In some instances, the original design of all or part of the structure could be in accordance with other standards in the ISO 19900 series, and in some cases, different practices or standards could have been applied.

The purpose of the site assessment is to demonstrate the adequacy of the jack-up and its foundations for the assessment situations and defined limit states, taking into account the consequences of failure. It is important that the results of a site-specific assessment be appropriately recorded and communicated to those persons required to know or act on the conclusions and recommendations. Alternative approaches to the site-specific assessment can be used, provided that they have been shown to give a level of structural reliability equivalent, or superior, to that implicit in this part of ISO 19905.

Annex A provides background to and guidance on the use of this part of ISO 19905. The clause numbering in Annex A is the same as in the normative text in order to facilitate cross-referencing. ISO/TR 19905-2 provides additional background to some clauses and a detailed sample 'go-by' calculation.

Annex B summarizes the partial factors. Supplementary information is presented in Annexes C to H.

To meet certain needs of industry for linking software to specific elements in this part of ISO 19905, a special numbering system has been permitted for figures, tables, formulae and bibliographic references.

In International Standards, the following verbal forms are used:

ISO 19905-1:2016(E)

- “shall” and “shall not” are used to indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted;
- “should” and “should not” are used to indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited;
- “may” is used to indicate a course of action permissible within the limits of the document;
- “can” and “cannot” are used for statements of possibility and capability, whether material, physical or causal.

Petroleum and natural gas industries — Site-specific assessment of mobile offshore units — Part 1: Jack-ups

1 Scope

This part of ISO 19905 specifies requirements and guidance for the site-specific assessment of independent leg jack-up units for use in the petroleum and natural gas industries. It addresses:

- a) manned non-evacuated, manned evacuated and unmanned jack-ups;
- b) the installed phase at a specific site.

To ensure acceptable reliability, the provisions of this part of ISO 19905 form an integrated approach, which is used in its entirety for the site-specific assessment of a jack-up.

This part of ISO 19905 does not apply specifically to mobile offshore drilling units operating in regions subject to sea ice and icebergs. When assessing a jack-up operating in such areas, it is intended that the assessor supplement the provisions of this part of ISO 19905 with the provisions relating to ice actions and procedures for ice management contained in ISO 19906.

This part of ISO 19905 does not address design, transportation to and from site, or installation and removal from site. However, it is advisable that the assumptions used in the assessment be checked against the as-installed configuration.

To ensure that the design of the jack-up is sound and the structure is adequately maintained, this part of ISO 19905 is applicable only to independent leg jack-ups that either:

- hold a valid classification society certification from a recognized classification society (RCS) throughout the duration of the operation at the specific site subject to assessment; or
- have been verified by an independent competent body to be structurally fit for purpose for elevated situations and are subject to periodic inspection, both to the standards of an RCS.

NOTE 1 An RCS is an International Association of Classification Societies (IACS) member body, meeting the RCS definition given in 3.52.

Jack-ups that do not comply with this requirement are assessed according to the provisions of ISO 19902, supplemented by methodologies from this part of ISO 19905, where applicable.

NOTE 2 Future revisions of this part of ISO 19905 can be expanded to cover mat-supported jack-ups.

NOTE 3 Well conductors are a safety-critical element for jack-up operations. However, the integrity of well conductors is not part of the site-specific assessment process for jack-ups and is, therefore, not addressed in this part of ISO 19905. Annex A provides references to other publications addressing this topic.

NOTE 4 RCS rules and the IMO MODU code provide guidance for the design of jack-ups.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-