# Planning, Designing, and Constructing Fixed Offshore Platforms—Load and Resistance Factor Design

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## Foreword

This document contains engineering design principles and good practices that have evolved during the development of offshore oil resources. Good practice is based on good engineering; therefore, this recommended practice consists essentially of good engineering recommendations. In no case is any specific recommendation included that could not be accomplished by presently available techniques and equipment. Consideration is given in all cases to the safety of personnel, compliance with existing regulations, and antipollution of water bodies.

Offshore technology continues to evolve. In those areas where the committee felt that adequate data were available, specific and detailed recommendations are given. In other areas, general statements are used to indicate that consideration should be given to those particular points. Designers are encouraged to utilize all research advances available to them. As offshore knowledge continues to grow, this document will be revised. It is hoped that the general statements contained herein will gradually be replaced by detailed recommendations.

The verbal forms used to express the provisions in this standard are as follows:

— the term “shall” denotes a minimum requirement in order to conform to the standard;

— the term “should” denotes a recommendation or that which is advised but not required in order to conform to the standard;

— the term “may” is used to express permission or a provision that is optional;

— the term “can” is used to express possibility or capability.



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Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every 5 years. A one-time extension of up to 2 years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 200 Massachusetts Avenue, NW, Washington, DC 20001.

Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Washington, DC 20001, standards@api.org.

*Attention Users of This Publication*: This edition supersedes the 1st Edition dated July 1993, as well as Errata dated October 1993 and Supplement 1 dated February 1997. Portions of this publication have been changed from the previous edition. In some cases the changes are significant, while in other cases the changes reflect minor editorial adjustments in order to conform to current API styling. Because the document was significantly reformatted from the previous edition, no attempt was made to indicate the locations of changes with bar notations.

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## Introduction

The API offshore structures standards 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 loads/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 standards are intended to provide a 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 standards.

Annex A provides background to and guidance on the—much but not all—use of this document and needs to be read in conjunction with the main body of this document. The section 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 Sections 19 and 20. If the material category approach is used, the corresponding provisions of Annexes C and D are normative; if the design class approach is used, the corresponding provisions of ISO 19902 are normative.

Annex E gives requirements on fabrication tolerances. To meet certain needs of industry for linking software to specific elements in this document, a special numbering system has been permitted for figures, tables, equations, and bibliographic references.

# Planning, Designing, and Constructing Fixed Offshore Platforms—Load and Resistance Factor Design

## 1 Scope

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

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

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

— assessment of existing structures;

— evaluation of structures for reuse at different locations.

Requirements for topsides structures can be found in API 2TOP, for marine operations in API 2MOP, and for the site-specific assessment of jack-ups in ISO 19905-1. Additional requirements for the design of fixed steel offshore structures in arctic environments can be found in API 2N.

## 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 applies (including any addenda/errata).

API Recommended Practice 2EQ, *Seismic Design Procedures and Criteria for Offshore Structures*

API Recommended Practice 2FB, *Recommended Practice for Design of Offshore Facilities Against Fire and Blast Loading*

API Recommended Practice 2GEO, *Geotechnical and Foundation Design Considerations*

API Recommended Practice 2GEO, *Geotechnical and Foundation Design Considerations*, First Edition

API Recommended Practice 2MET, *Derivation of Metocean Design and Operating Conditions*

API Recommended Practice 2MOP, *Marine Operations*

API Recommended Practice 2MOP, *Marine Operations*, First Edition