Planning, Designing, and Constructing Floating Production Systems

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Foreword

API 2FPS is one of a series of API and other standards for offshore structures in the Gulf of Mexico. This suite of standards, hereby referenced as the API Floating Structures Standards (AFSS), are a suite of applicable "Working Stress Design" standards for structures to be deployed in U.S. waters. The suite consists of the following standards.

— API 2A-WSD, Planning, Designing and Constructing Fixed Offshore Platforms-Working Stress Design

— API Spec 2C, Specification for Offshore Cranes

— API RP 2D, Recommended Practice for Operation and Maintenance of Offshore Cranes

— API Bull 2INT-MET, Interim Guidance on Hurricane Conditions in the Gulf of Mexico

— API RP 2MOP, Marine Operations

— API RP 2RD, Recommended Practice for Design of Risers for Floating Production Systems (FPSs) and Tension-Leg Platforms (TLPs)

— API 2SIM, Structural Integrity Management of Fixed Offshore Structures

— API RP 2SK, Design and Analysis of Stationkeeping Systems for Floating Structures

— API RP 2T, Recommended Practice for Planning, Design and Constructing Tension Leg Platforms

— API Bull 2U, Stability Design of Cylindrical Shells

— API Bull 2V, Design of Flat Plate Structures

— API RP 14J, Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities

— API RP 75L, Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operation and Associated Activities

— AISC 360-05, Specification for Structural Steel Buildings

— AWS D1.1, Structural Welding Code - Steel

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Should: As used in a standard, “should” denotes a recommendation or that which is advised but not required in order to conform to the specification.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

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Introduction

The series of Standards applicable to types of offshore structure, constitutes a common basis covering those aspects that address design requirements and assessments of all offshore structures used by the petroleum, petrochemical 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 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 series of Standards applicable to types of offshore structure is intended to provide 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 International Standards.

API 2FPS was developed in response to the offshore industry's demand for a coherent and consistent definition of methodologies to design, analyse and assess floating offshore structures of the class described in Clause 1. In particular, this standard addresses monohulls, semi-submersibles and spars.

Some background to, and guidance on, the use of this standard is provided in informative Annex A. The clause numbering in Annex A is the same as in the normative text to facilitate cross-referencing.

Planning, Designing, and Constructing Floating Production Systems

1 Scope

This document provides requirements and guidance for the structural design and/or assessment of floating offshore platforms used by the petroleum and natural gas industries to support the following functions:

— production;

— storage and/or offloading;

— drilling and production;

— production, storage and offloading;

— drilling, production, storage and offloading.

NOTE 1 Floating offshore platforms are often referred to using a variety of abbreviations, e.g. FPS, FSU, FPSO, etc. (see Clauses 3 and 4), in accordance with their intended mission.

NOTE 2 In this standard, the term “floating structure”, sometimes shortened to “structure”, is used as a generic term to indicate the structural systems of any member of the classes of platforms defined above.

NOTE 3 In some cases, floating platforms are designated as “early production platforms”. This term relates merely to an asset development strategy. For the purposes of this International Standard, the term “production” includes “early production”.

Its requirements do not apply to the structural systems of mobile offshore units (MOUs). These include, among others:

— floating structures intended primarily to perform drilling and/or well intervention operations (often referred to as MODUs), even when used for extended well test operations;

— floating structures used for offshore construction operations (e.g. crane barges or pipelay barges), for temporary or permanent offshore living quarters (floatels), or for transport of equipment or products (e.g. transportation barges, cargo barges), for which structures reference is made to relevant recognized classification society (RCS) rules.

Its requirements are applicable to all possible life-cycle stages of the structures defined above, such as

— design, construction and installation of new structures, including requirements for inspection, integrity management and future removal,

— structural integrity management covering inspection and assessment of structures in-service, and

— conversion of structures for different use (e.g. a tanker converted to a production platform) or reuse at different locations.

The following types of floating structure are explicitly considered within the context of this standard:

a) monohulls (ship-shaped structures and barges);

b) semi-submersibles;

c) spars.