

# Design, Manufacture, Installation, and Maintenance of Synthetic Fiber Ropes for Offshore Mooring

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## Foreword

API 2SM is under the jurisdiction of the API Subcommittee on Offshore Structures. The main purpose of this document is to provide guidelines on the use of synthetic fiber ropes for offshore mooring applications. The secondary purpose of this document is to highlight differences between synthetic rope and traditional steel mooring systems, and to provide practical guidance on how to handle these differences during system design and installation.

The contents of this document should be used in conjunction with the most recent editions of API 2SK and API 2L and other recommended practices and standards, as appropriate. Where the mooring design, construction and installation details are similar or equivalent to steel mooring systems, no further comments are included in this document.

This document reflects the latest learning from research, design, installation, and operation of synthetic fiber mooring components. The technology in synthetic fiber rope moorings continues to evolve. Designers are advised to take appropriate measures to ensure that their practices incorporate all research advances available to them.

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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](mailto:standards@api.org).

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# Design, Manufacture, Installation, and Maintenance of Synthetic Fiber Ropes for Offshore Mooring

## 1 Scope

**1.1** This document applies to synthetic fiber ropes used in the form of taut leg or catenary moorings for both permanent and temporary offshore installations such as:

- a) monohull-based floating production, storage, and offloading units (FPSOs);
- b) monohull-based floating storage units (FSOs, FSUs);
- c) monohull or semi-submersible based floating production units (FPUs, FPSs);
- d) mobile offshore drilling units (MODUs);
- e) spar platforms;
- f) catenary anchor leg mooring (CALM) buoys (spread mooring only);
- g) mobile offshore units (MOUs, e.g., construction, pipelay, floating accommodation vessels).

**1.2** This document covers the following aspects of synthetic fiber ropes:

- a) design and analysis considerations of mooring systems;
- b) design criteria for mooring components;
- c) rope design;
- d) rope specification and testing;
- e) rope manufacture and quality assurance;
- f) rope handling and installation;
- g) in-service inspection and maintenance.

**1.3** Application of this document to other offshore mooring applications is at the discretion of the designer and operator. This document is not intended to cover other marine applications of synthetic fiber ropes such as tanker mooring at piers and harbors, towing hawsers, mooring hawsers at single-point moorings (SPMs), and tension leg platform (TLP) tethers. Additionally, very little test data are available for large synthetic fiber ropes permanently deployed around fairleads and thus this document is limited to fiber ropes which span freely between end terminations.

## 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 RP 2I, *In-Service Inspection of Mooring Hardware for Floating Drilling Units*

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