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## **Ships and marine technology — Single point mooring arrangements for conventional tankers**

*Navires et technologie marine — Emplacements pour point d'amarrage unique pour les navires-citernes conventionnels*

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## 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)).

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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](http://standards.iteh.ai/Foreword-Supplementary-information)

The committee responsible for this document ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

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# Ships and marine technology — Single point mooring arrangements for conventional tankers

## 1 Scope

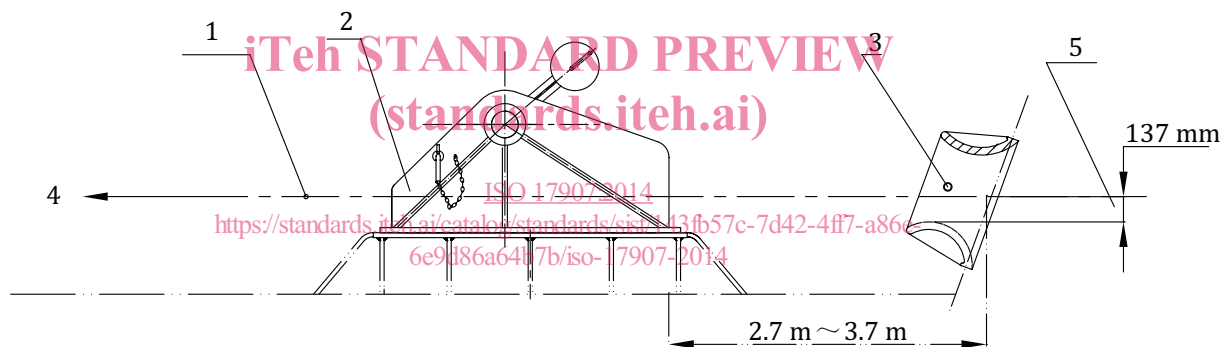
This International Standard specifies the technical requirements and test methods for the equipment necessary for the ships intended to use single point mooring (hereinafter referred to as “SPM”) arrangements, such as bow chain stoppers, bow fairleads, and pedestal rollers.

This International Standard is applicable to the SPM arrangements provided for tankers, gas carriers, and chemical vessels.

## 2 Technical requirements

### 2.1 Design arrangement of SPM arrangements for tankers

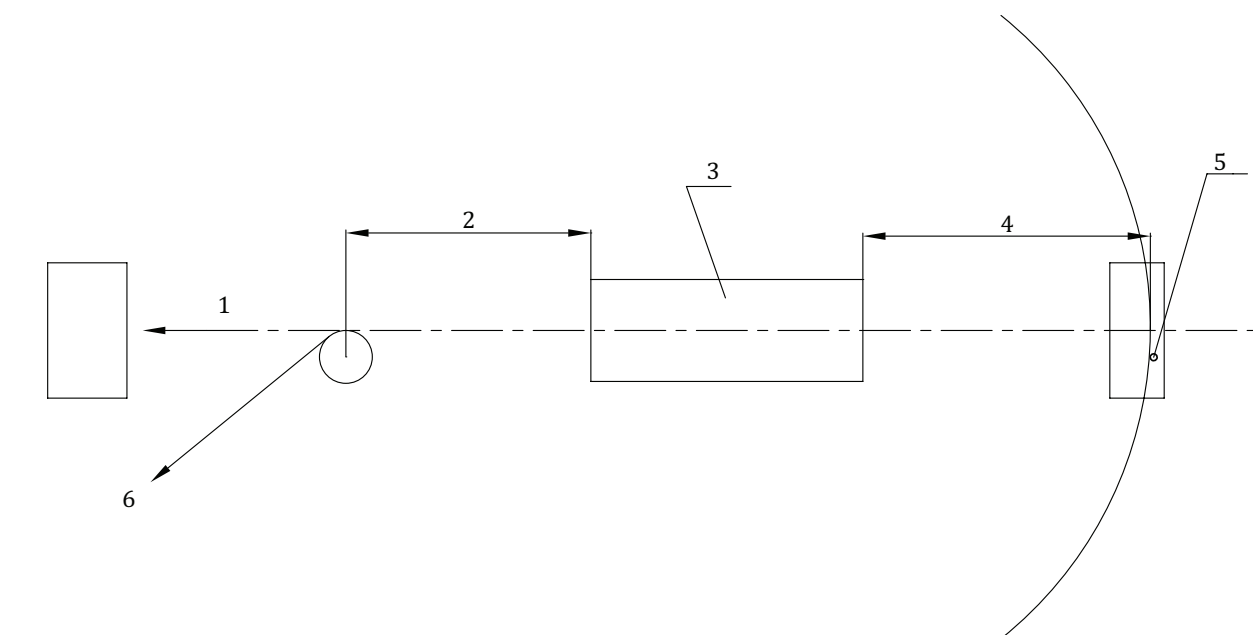
The general design arrangement is given in [Figure 1](#) and [Figure 2](#).



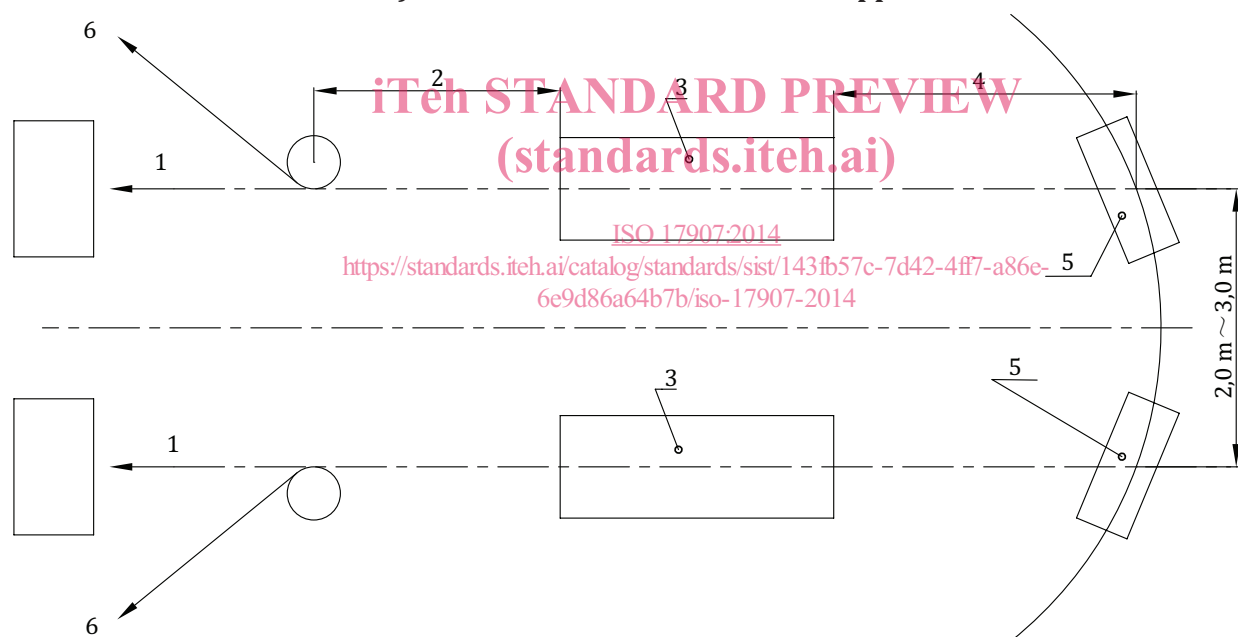
#### Key

- 1 centreline of chain parallel to deck
- 2 bow chain stopper
- 3 bow fairlead
- 4 to pedestal roller or direct to winch storage drum
- 5 half breadth of chain

**Figure 1 — General arrangement of SPM arrangements for tankers**



a) Installed with one bow chain stopper



b) Installed with two bow chain stoppers

**Key**

- 1 direct to winch storage drum without pedestal rollers
- 2 not less than 3 m from aft side of bow chain stopper
- 3 bow chain stopper
- 4 distance between fairlead and front side of the bow chain stopper is 2,7 m~3,7 m
- 5 bow fairlead
- 6 to winch storage drum via pedestal rollers

**Figure 2 — General arrangement of SPM arrangements for tankers installed with different stoppers**

## 2.2 Configuration and design manufacturing requirements for SPM arrangements for tankers

### 2.2.1 Bow chain stoppers

- a) The configuration and load requirements are given in [Table 1](#).

**Table 1 — Configuration and load requirements of chain stoppers**

Ship size	Number of bow chain stoppers	Minimum safe working load (SWL) (t)
100 000 tonnes DWT or less (Two chain stoppers can also be installed on the ship of such size)	1	200
Over 100 000 but not greater than 150 000 tonnes DWT (Two chain stoppers can also be installed on the ship of such size)	1	250
Over 150 000 tonnes DWT	2	350
NOTE The safety factor on yield of bow chain stoppers should be minimum of 2,0 SWL.		

- b) The general types of bow chain stoppers are given in [Annex A](#).
- c) In the closed position, the design shall be such that it can prevent chafe chains from throw-out due to the sudden release.
- d) The operating force of bow chain stoppers shall be not more than 245 N.
- e) Materials can be weldable cast steel, forged steel, or rolled steel, which conform to the corresponding manufacturing standard.
- f) The product shall be free from defects that affect its use, such as cracks, sand holes, and pores.
- g) When the chain stopper is welded to the foundation, the weld strength shall be capable of withstanding 2,0 times the SWL; when it is bolted to the foundation, effective thrust blocks shall be provided to reduce shear.
- h) When the ship is provided with the bow chain stopper of an emergency towing arrangement, the SPM bow chain stopper may also be used as the bow chain stopper of the emergency towing arrangement.

### 2.2.2 Bow fairleads

- a) The configuration and load requirements shall be consistent with those of the matching SPM bow chain stoppers.
- b) The general type of bow fairleads is given in [Annex B](#).
- c) The bow fairlead shall be of closed type, with the opening dimensions of at least 600 mm in width and 450 mm in height.
- d) The strength should be sufficient for all relevant angles of towline, i.e. up to 90° from the ship's centreline to port and starboard and 30° vertical upwards and downwards.
- e) Materials can be weldable cast steel, forged steel, or rolled steel, which conform to the corresponding manufacturing standard.
- f) The product shall be free from defects that affect its use, such as cracks, sand holes, and pores.

- g) When the ship is provided with the bow fairlead of an emergency towing arrangement, the SPM bow fairlead may also be used as the bow fairlead of the emergency towing arrangement.

### 2.2.3 Pedestal rollers

- a) The general type of pedestal rollers is given in [Annex C](#).
- b) The pedestal rollers are capable to withstand a horizontal force equal to the greater of the two values:
- 225 kN;
  - the resultant force due to an assumed pull of 225 kN in the pick-up rope.
- c) The common specifications of pedestal rollers are  $\varnothing 350$ ,  $\varnothing 400$ , and  $\varnothing 450$ .
- d) Materials can be weldable cast steel, forged steel, or rolled steel, which conform to the corresponding manufacturing standard.
- e) The product shall be free from defects that affect its use, such as cracks, sand holes, and pores.

## 3 Test method

### 3.1 Bow chain stoppers

#### 3.1.1 Material test

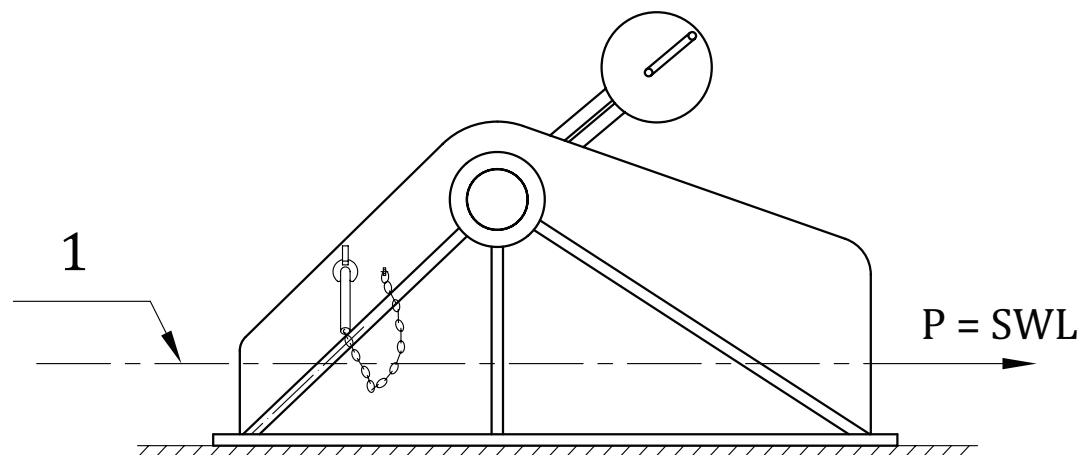
If the material is cast steel, physical and chemical inspection shall be carried out for the material test rods and inspection results shall conform to the corresponding material standards. Magnetic particle inspection shall be carried out after surface polishing, and the product shall be free from defects that affect its use, such as cracks, sand holes, and pores.

For components made of forgings, physical and chemical inspection shall be carried out for the material test rods and inspection results shall conform to the corresponding material standards. Ultrasonic detection shall be made according to Grade II forging requirements, and the component shall be free from cracks, folding, or other defects that affect its use.

The welds on the weldments shall be smooth and flat; ultrasonic detection shall be made for main welds, which shall be free from defects that affect the use, such as cracks, sand holes, pores, and weld flashes.



### 3.1.2 Strength test



#### Key

1 chafe chain centreline

**Figure 3 — Strength test on bow chain stopper**

The test load shall be applied to the chafe chain centreline for 1 min and magnetic particle inspection shall be carried out for the bow chain stopper after unloading, to ensure its main welds or castings shall be free from defects that affect its use. See Figure 3.

### 3.1.3 Operation test

Take a balance weight of 25 kg mass, and verify that the operating force of chain stoppers vertical to the operating lever shall be not more than 245 N according to the lever balance theory.

## 3.2 Bow fairleads

### 3.2.1 Material test

If the material is cast steel, physical and chemical inspection shall be carried out for the material test rods and inspection results shall conform to the corresponding material standards. Magnetic particle inspection shall be carried out after surface polishing, and the product shall be free from defects that affect its use, such as cracks, sand holes, and pores.

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