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Ships and marine technology — Marine combined connecting mooring line

Navires et technologie maritime — Ligne d'amarrage combinée marine

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Foreword

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This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

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Ships and marine technology — Marine combined connecting mooring line

1 Scope

This document specifies the classification, structure and code, design requirements and testing methods of a marine combined connecting mooring line (hereinafter referred to as a combined line), which consists of a mooring line, connection device and tail.

This document applies to the design, manufacture and inspection of combined lines for tankers.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1140, *Fibre ropes — Polyamide — 3-, 4-, 8- and 12-strand ropes*

ISO 1141, *Fibre ropes — Polyester — 3-, 4-, 8- and 12-strand ropes*

ISO 2307:2019, *Fibre ropes — Determination of certain physical and mechanical properties*

ISO 2408:2017, *Steel wire ropes — Requirements*

ISO 9554, *Fibre ropes — General specifications*

ISO 16143-1:2014, *Stainless steels for general purposes — Part 1: Corrosion-resistant flat products*

ISO 10325, *Fibre ropes — High modulus polyethylene — 8-strand braided ropes, 12-strand braided ropes and covered ropes*

ISO 10556, *Fibre ropes of polyester/polyolefin dual fibres*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
fibre rope
rope made from synthetic fibre

3.2
tail
short length of rope attached to the end of a mooring line to provide increased elasticity and also ease of handling

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3.3
cow hitch
method of joining two *fibre ropes* (3.1) without connection device

3.4
ship design minimum breaking load
ship design MBL
minimum breaking load of new, dry mooring lines for which a ship's mooring system is designed

Note 1 to entry: This minimum breaking load is expressed in kN.

3.5
line design break force
LDBF
minimum force at which a new, dry, spliced mooring line will break when tested

Note 1 to entry: This minimum force is expressed in kN.

3.6
tail design break force
TDBF
minimum force at which a new, wet, spliced tail will break when tested

Note 1 to entry: This minimum force is expressed in kN.

3.7
working load limit
WLL
maximum allowable load the mooring line is able to sustain

Note 1 to entry: This maximum allowable load is expressed in t.

3.8
proof load
force applied as a test to a finished connection device

Note 1 to entry: This force is expressed in kN.

3.9
ultimate load
maximum force reached during a static tensile test before the assembly being tested fails to retain the load

Note 1 to entry: This maximum force is expressed in kN.

3.10
safe working load
SWL
rated capacity of the connection device to withstand tensile force

4 Classification, structure and code

4.1 Classification

The combined lines can be classified into three types according to the way it can be connected. The three types include T type, M type and C type. The code, type and content of combined line are shown in Table 1.

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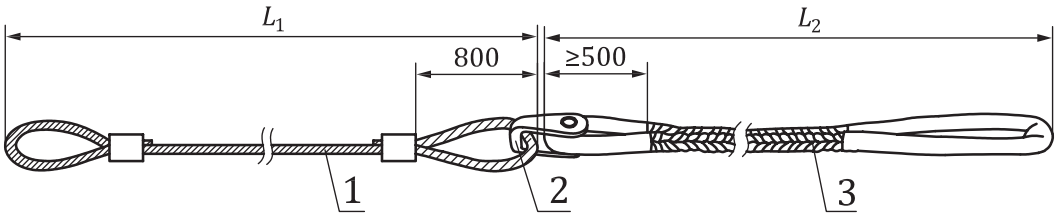
Table 1 — Three types of combined lines

Code	Type	Content
T	T type combined line	link without roller type combined line, see Figure 1
M	M type combined line	link with roller type combined line, see Figure 2
C	C type combined line	cow hitch type combined line, see Figure 3

4.2 Structure

The T type combined line is shown in Figure 1.

Dimensions in millimetres



Key

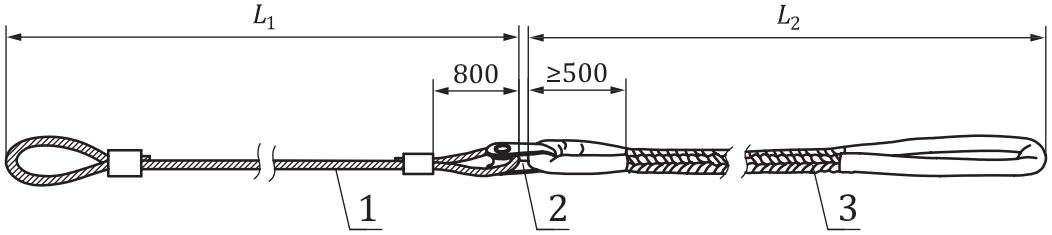
1	mooring rope
2	link without roller
3	tail
L_1	length of mooring rope
L_2	length of tail

NOTE L_1 and L_2 can be selected according to users' demands.

Figure 1 — T type combined line

The M type combined line is shown in Figure 2.

Dimensions in millimetres



Key

1	mooring rope
2	link with roller
3	tail
L_1	length of mooring rope
L_2	length of tail

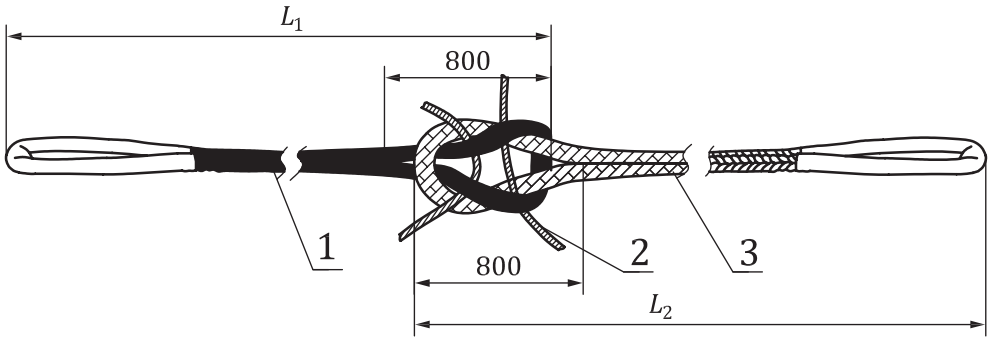
NOTE L_1 and L_2 can be selected according to users' demands.

Figure 2 — M type combined line

The C type combined line is shown in Figure 3.

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Dimensions in millimetres



Key

1	mooring rope
2	haulage rope
3	tail
L_1	length of mooring rope
L_2	length of tail

NOTE 1 L_1 and L_2 can be selected according to users' demands.

NOTE 2 The haulage rope with Φ10 mm to Φ16 mm can be selected for separating the mooring rope and tail.

Figure 3 — C type combined line

4.3 Codes

The codes of the main components of combined lines are shown in Table 2. The applicable standards listed in Table 2 shall apply.

Table 2 — Codes of main components

Items	Material components	Applicable standard	Code
mooring rope	steel wire rope	ISO 2408	WR
	high modulus polyethylene (HMPE) rope	ISO 10325	HP
	LCP fibre rope	—	LCP
	aramid fibre rope	—	AR
connection device	X20Cr13 or equal strength material [a]	ISO 16143-1	GS
tail	polyamide rope	ISO 1140	SR1
	polyester rope	ISO 1141	SR2
	fibre ropes of polyester or polyolefin dual fibres	ISO 10556	SR3

[a] X20Cr13 is a material grade specified in ISO 16143-1.

5 Design requirements

5.1 General

The combined lines shall be designed as follows:

a) The line design break force (LDBF) of the mooring rope shall be 100 % to 105 % of the ship design minimum breaking load (MBL).

b) Steel wire ropes shall have a working load limit (WLL) of 55 % of the ship design MBL, and fibre ropes shall have a WLL of 50 % of the ship design MBL.

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