

Design, Selection, Inspection and Maintenance of Mooring Equipment

Amended Rules and Guidance

Rules for the Survey and Construction of Steel Ships Parts B, C, CS, D, and L
Rules for the Survey and Construction of Passenger Ships
Guidance for the Survey and Construction of Steel Ships Parts B, C, and O
Guidance for the Survey and Construction of Passenger Ships
Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use

Reason for Amendment

In 2016, IACS conducted a complete review of Unified Requirements A1 and A2 as well as Recommendation No.10, which are related to towing and mooring equipment. The Society has already incorporated the latest revisions of these into its Rules for the Survey and Construction of Steel Ships.

The IMO thereafter also reviewed its regulations related to towing and mooring equipment (including mooring lines) and adopted amendments to SOLAS Chapter II-1 Regulation 3-8 as Resolution MSC.474(102) at the 102nd session of the IMO Maritime Safety Committee (MSC) in November 2020 as a result. In conjunction with the amending of SOLAS, the IMO adopted two new sets of guidelines related to towing and mooring equipment in December 2020: the *Guidelines on the Design of Mooring Arrangements and the Selection of Appropriate Mooring Equipment and Fittings for Safe Mooring* (adopted as MSC.1/Circ.1619) and the *Guidelines for Inspection and Maintenance of Mooring Equipment Including Lines* (adopted as MSC.1/Circ.1620). References to these two new guidelines were also added to SOLAS.

In addition to the above, IACS reviewed its Unified Interpretation (UI) SC212 and revised it so as to ensure that authorities and ROs comply with the requirements specified in the aforementioned IMO circulars. A draft revision of the UI was submitted as UI SC212(Rev.1) to the IMO for review and subsequently approved at MSC107 in May 2023.

Accordingly, relevant requirements are amended based upon MSC.474(102), MSC.1/Circ.1619, MSC.1/Circ.1620 and UI SC212 (Rev.1).

Outline of Amendment

- (1) Specifies requirements for the arrangement and selection of mooring equipment in accordance with MSC.1/Circ.1619.
- (2) Specifies requirements for the inspection and maintenance of mooring equipment (including mooring lines) in accordance with MSC.1/Circ.1620.
- (3) Specifies those matters in MSC.1/Circ.1619 and MSC.1/Circ.1620 that are required to be checked during class inspections in accordance with UI SC212(Rev.1).

“Rules for the survey and construction of steel ships” has been partly amended as follows:

Part B CLASS SURVEYS

Chapter 2 CLASSIFICATION SURVEYS

2.1 Classification Survey during Construction

2.1.3 Submission of Other Plans and Documents

Sub-paragraph -1(18) has been added as follows.

1 When it is intended to build a ship to the classification with the Society the following plans and documents are to be submitted, in addition to those required in 2.1.2:

((1) to (17) are omitted.)

(18) Technical specification documents for mooring lines (14.4.4.4, Part 1, Part C)

2.1.6 Documents to be Maintained On Board*

Sub-paragraph -1 has been amended as follows.

1 At the completion of a classification survey, the Surveyor confirms that the finished versions of the following applicable drawings, plans, manuals, lists, etc., are on board.

((1) is omitted.)

(2) Other documents

((a) to (x) are omitted.)

(y) Management plans for inspection and maintenance of mooring equipment (including mooring lines)

(z) Technical specification documents for mooring lines (14.4.4.4, Part 1, Part C)

Chapter 3 ANNUAL SURVEYS

3.2 Annual Surveys for Hull, Equipment, Fire Extinction and Fittings

3.2.1 Examination of Plans and Documents*

Table B3.1 has been amended as follows.

Table B3.1 Examination of Plans and Documents

Items	Examination
1 Loading Manual	(1) For ships required to have the manual on board in accordance with the requirements of 3.8.1.1, Part 1, Part C, and 25.1.1, Part CS, confirmation that the manual is kept on board is to be made.
2 Stability Information Booklet	(1) Confirmation as to whether the booklet is kept on board is to be made.
3 Damage Control Plan, Booklet and Damage Stability Information	(1) For ships required to have the damage control plan on board in accordance with the requirement in 2.3.4, Part 1, Part C, confirmation that the approved plan is exhibited and the booklet containing the information shown in the plan and the damage stability information are kept on board is to be made.
4 Fire Control Plan	(1) Confirmation that the fire control plan is exhibited and properly stored is to be made.
5 Operating and Maintenance Manual for the door and inner door and notices indicating procedures for closing and securing	(1) For ships required to have the manual and notices on board in accordance with the requirements in 14.10, Part 1, Part C, and Chapter 21, Part CS; (2) Confirmation that the manual is kept on board is to be made. (3) Confirmation that the board is exhibited is to be made.
6 Instruction Manuals for the Inert Gas System	(1) For ships required to have the manual on board in accordance with the requirements of 4.5.5, Part R, confirmation that the manual is kept on board is to be made.
7 Towing and Mooring Fitting Arrangement Plan	(1) Confirmation that the Towing and Mooring Fitting Arrangement Plan specified in 14.4, Part 1, Part C or 23.2, Part CS is kept on board is to be made.
8 Ship Structure Access Manual	(1) For ships required to have the manual on board in accordance with the requirements of 14.16.3.6, Part 1, Part C or 26.2.6, Part CS, confirmation that the manual is kept on board and updated as necessary is to be made.
9 Documents related to the surveys for bulk carriers, oil tankers and ships carrying dangerous chemicals in bulk with integral tanks	(1) Confirmation that the documents are kept on board is to be made.
10 Coating Technical File and/or Corrosion Resistant Steel Technical File	(1) For ships required to have a Coating Technical File for dedicated seawater ballast tanks, etc. on board in accordance with the requirements of 3.3.5.3, Part 1, Part C, 22.4.2, Part CS, 1.2.2 Section 5 Chapter 3, Part CSR-B or 2.1.1.2 Section 6, Part CSR-T, confirmation that the file is kept on board and that maintenance and repair work are properly recorded and kept on the file is to be made. (2) For ships required to have a Coating Technical File and/or a Corrosion Resistant Steel Technical File for cargo oil tanks on board in accordance with the requirements of 3.3.5.4, Part 1, Part C or 22.4.3, Part CS, confirmation that the files are kept on board and that maintenance and repair work are properly recorded and kept on the files is to be made.

11 Noise survey report	(1)	Confirmation that the report is kept on board
12 Polar Water Operational Manual	(1)	For ships required to have the manual on board in accordance with the requirements of 2.3.1, Part I, confirmation that the manual is kept on board is to be made.
13 Drawings indicating critical structural areas, construction monitoring plan and all construction monitoring survey records	(1)	For ships affixed with the notation “ <i>HCM</i> ” or “ <i>HCM-GBS</i> ”, confirmation that the documents are kept on board is to be made.
14 Watertight cable penetration register	(1)	Confirmation that the register is kept on board and updated as necessary is to be made.
15 Management plans for inspection and maintenance of mooring equipment (including mooring lines)	(1)	Confirmation that the plan is kept on board and updated as <u>necessary is to be made.</u>

Part C HULL CONSTRUCTION AND EQUIPMENT

Part 1 GENERAL HULL REQUIREMENTS

Chapter 14 EQUIPMENT

14.4 Towing and Mooring Arrangement

14.4.1 General

14.4.1.1 Applications and Definitions*

Sub-paragraph -7 has been amended as follows.

7 The definitions of terms which appear in 14.4 are as follows.

((1) to (13) are omitted.)

(14) Mooring area

“Mooring area” refers to the dedicated area on a ship where mooring equipment is installed and line-handling takes place. It also includes areas where there is a risk of personnel injury in event of snap-back or other failure of mooring equipment.

(15) Working Load Limit (*WLL*)

“Working Load Limit (*WLL*)” means the maximum load that a mooring line should be subjected to in operational service, calculated from the relevant environmental mooring restraint requirement.

(16) Bend radius (*D/d* ratio)

“Bend radius (*D/d* ratio)” means the diameter (*D*) of a mooring fitting divided by the diameter (*d*) of a mooring line that is led around or through the fitting.

Paragraph 14.4.1.4 has been amended as follows.

14.4.1.4 Towing and Mooring Fitting Arrangements Plan

(-1 is omitted.)

2 Information provided on the plan is to include the following.

((1) to (6) are omitted.)

(7) Winch brake holding capacities

(8) For ships of 3,000 gross tonnage and above, documentation confirming that *MSC.1/Circ.1619* has been considered.

(9) The length of each mooring line

~~(7)10~~ Other information or notes related to the design of shipboard fittings or lines.

14.4.3.2 Mooring Lines*

Sub-paragraph -1 has been amended as follows.

1 Mooring lines are to be in accordance with the following (1) to (5).

((1) and (2) are omitted.)

(3) Fibre ropes used for mooring lines are to be not less than 20 mm in diameter. ~~For considering rope age degradation and wear, the line design break force for such ropes is to be in accordance~~

~~with the following (a) or (b). However, neither (a) nor (b) need to be complied with in cases where consideration of rope age degradation and wear is included in the method specified in 14.4.3.1.~~

~~(a) Polyamide ropes: $LDBF \geq 120\%$ of MBL_{sa}~~

~~(b) Other synthetic ropes: $LDBF \geq 110\%$ of MBL_{sa}~~

((4) and (5) are omitted.)

14.4.3.3 Mooring Fittings

Sub-paragraph -2 has been amended as follows.

2 The arrangement of mooring fittings is to be in accordance with the following (1) and (3).

(1) Mooring fittings, mooring winches and capstans are to be located on stiffeners, girders, or both which are parts of the deck construction so as to facilitate efficient distribution of the mooring load.

(2) When mooring fittings, mooring winches and capstans cannot be located as specified in (1), appropriate reinforced members are to be provided directly underneath the towing fittings.

(3) ~~Mooring arrangements are recommended as follows.~~

~~(a) As far as possible, a sufficient number of mooring winches is to be fitted to allow for all mooring lines to be belayed on winches. If the mooring arrangement is designed such that mooring lines are partly belayed on bitts or bollards, it is to be considered that these lines may not be as effective as the mooring lines belayed on winches. Mooring lines are to have as straight a lead as is practicable from the mooring drum to the fairlead.~~

~~(b) At points of changes in direction, sufficiently large radii of the contact surface of a rope on a fitting is to be provided to minimise the wear experienced by mooring lines and as recommended by the rope manufacturer for the rope type intended to be used.~~

~~(c) Attention is to be given to the arrangement of the equipment for mooring operations in order to prevent interference of the mooring lines as far as practicable.~~

Paragraph 14.4.4 has been added as follows.

14.4.4 Arrangement and selection of mooring line, mooring equipment, capstan, and winch

14.4.4.1 Application

1 The requirements in this 14.4.4 apply to ships of 3,000 gross tonnage and above.

2 Ships of less than 3,000 gross tonnage are to comply with the requirements in this 14.4.4 as far as reasonably practicable, or are to comply with applicable the national standards of their respective Administration.

14.4.4.2 Arrangement of mooring line, mooring equipment, capstan, and winch

1 The arrangement of mooring lines, mooring equipment, capstans and winches is to be in accordance with the following (1) through (11).

(1) To minimise the need for complex mooring line configurations during the normal operation of the ship, mooring winches and fairleads are to be positioned to allow the use of direct, unobstructed leads from mooring winches to the fairleads for each mooring line described in the towing and mooring arrangements plan.

(2) Where the arrangement in (1) above is not possible, the following (a) to (c) measures are to be considered.

- (a) The deviation from straight leads are to be by means of pedestal fairleads, rolling fairleads or similar means that will reduce the friction between line/fitting and will reduce bend losses. Steel fittings such as horns or bollards without chafe protection are to be avoided.
- (b) Lines are to traverse mooring areas from winches to fairleads by the shortest route.
- (c) Changes of direction of mooring line are to be minimised to prevent reductions in mooring line strength due to bend loss and introduction of complex snap-back areas.
- (3) To provide for the oversight and supervision of mooring operations, mooring areas are to be designed to give supervising personnel unobstructed views of installed mooring lines, mooring equipment, capstans and winches. This is to also include the provision of platform or other appropriate means by which supervising personnel can obtain unobstructed views of mooring areas and the berth arrangements planned to be used from positions clear of hazards.
- (4) Mooring arrangements are to be designed to provide unobstructed views between shipboard personnel and the lines being worked within mooring areas.
- (5) Winch operators are to be provided with mooring winch controls that are positioned so as to allow operators direct views of the lines being worked in mooring areas worked without needing to step away from the winch controls. Winch controls are to be positioned clear of hazards.
- (6) Deck illumination is to provide clear views of mooring areas as well as the equipment and lines being worked during hours of darkness or in conditions of limited visibility.
- (7) Designs of mooring arrangements and mooring areas are to consider the following (a) to (c) constraints.
 - (a) Anticipated variations in shore-based mooring arrangements and the need to preserve flexibility in mooring line configurations to achieve an appropriate restraining capacity.
 - (b) Ship structural element (including accommodation, ventilation exhausts, cargo equipment or similar obstacles) impact on access.
 - (c) Special requirements for the location and selection of mooring lines, mooring equipment, capstans and winches; for example, special requirements for canal transits.
- (8) Unless not permitted by ship size or special features, mooring lines, mooring equipment, capstans and winches in mooring areas are to be positioned so as to provide shipboard personnel with unobstructed access to the following during mooring operations.
 - (a) Mooring winches and winch controls.
 - (b) Mooring fittings.
 - (c) Mooring lines and mooring line stowage.
 - (d) Spaces between shipside fairleads and winches to permit mooring personnel to safely apply stoppers to mooring lines when necessary.
- (9) Mooring arrangements are to be designed to avoid exposing shipboard personnel to lines under tension through snap-back or sudden movements of mooring lines. In this respect, the following measures are to be considered.
 - (a) Winches are to be located close to shipside fairleads. The position of winches is to not result in inappropriate mooring line orientations that block or otherwise interfere with the use of shipside fairleads for additional mooring lines, the connecting up of tugs for towage during mooring operations or the ability to safely moor the ship.
 - (b) Enclosing mooring lines behind barriers provided that such enclosures do not adversely affect mooring system performance and do not prevent the effective inspection and maintenance of equipment, fittings and mooring lines.
 - (c) Alternative designs where ship personnel do not need to work close to or have to pass mooring lines that are under tension or are potentially under tension.
 - (d) Use of appropriate, alternative means to moor the ship, including but not limited to automated mooring systems.
 - (e) Permanently fix mooring lines to mooring winches.

- (10) Mooring areas should be considered as potential snap-back zones and signage should be provided to indicate that this is the case.
- (11) To minimise the need for manual handling of towing and mooring lines, the following (a) to (f) measures are to be considered.
 - (a) Equipment and fitting arrangements should minimise the distance over which mooring lines may need to be handled.
 - (b) The use of fixed or dedicated mooring lines, considering the need to avoid inappropriate mooring line orientations that block or otherwise interfere with the use of shipside fairleads for additional mooring lines, the connecting up of tugs for towage during mooring operations or the ability to safely moor the ship.
 - (c) Layouts are to be designed to prevent manual intervention in transfers of mooring lines from storage drums to mooring winch drums and vice versa.
 - (d) Use of spooling equipment.
 - (e) Additional mooring lines are to be available for immediate use, provided that their stowage does not interfere with the safe operation of the mooring equipment.
 - (f) A sufficient number of mooring winches so that manual use of warping ends, stoppers, capstans and bitts is minimized, as far as possible, during mooring operations.

2 Being unable to comply with (2), (4), (5), (8), (9) and (11) above is to be recorded as supplementary information in towing and mooring fitting arrangements plan. The reasons for not being able to fulfill the requirements and appropriate safety measures taken instead are to also be included in this supplementary information.

3 Compliance with items (2), (4), (5), (8), (9) and (11) above is to be indicated on towing and mooring fitting arrangements plan.

14.4.4.3 Selection of mooring line, mooring equipment, capstan, and winch

1 Selection of mooring winches is to be in accordance with the following (1) to (5).

- (1) Consideration is to be given to the availability of winches with alternative drum arrangements, including split drum arrangements, which can reduce the need for manual handling of mooring lines during mooring operations.
- (2) Consideration is to be given to the positioning of winch controls, including the availability of remote controls for winches, to improve the lines of sight and reduce operator exposure to snap-backs.
- (3) Consideration is to be given to the availability of constant tension winches and their appropriateness for normal ship operations.
- (4) Consideration is to be given to limiting noise levels to ensure proper communication during mooring operations.
- (5) To avoid overloads on mooring winches, mooring winch brake holding capacities are to be less than 100 % of the Ship Design Minimum Breaking Load (MBL_{sd}). Alternatively, winches are to be fitted with brakes that allow for reliable settings of brake rendering loads.

2 Selections of mooring equipment and capstans are to be in accordance with the following (1) to (3).

- (1) Consideration is to be given to the diameter (D) of surfaces of mooring fittings that are in contact with mooring lines in relation to mooring line diameter (d) (i.e. the D/d ratio) to reduce or mitigate bend loss of strength.
- (2) Consideration is to be given to use mooring equipment and capstans with load-bearing surfaces to minimize damage from chafing and abrasion.
- (3) Mooring equipment and capstans are to be compatible in design, diameter, strength, suitability, etc. and maintained with the original purpose and concept of the mooring arrangement.

3 The selection of mooring line is to be in accordance with the following (1) to (7).

- (1) Consideration is to be given to the diameter (D) of surfaces of mooring fittings that are in contact with mooring lines in relation to mooring line diameter (d) (i.e. the D/d ratio) to reduce or mitigate bend loss of strength.
- (2) Consideration is to be given to the compatibility of the MBL_{sd} of mooring lines and the brake capacities of mooring winches installed on board.
- (3) Line Design Break Force ($LDBF$) is to be 100 % to 105 % of the MBL_{sd} . When lines made of nylon are used as mooring lines, the $LDBF$ of the lines is to be the tested under wet and spliced conditions.
- (4) Consideration is to be given to the characteristics and limitations of mooring lines (including the material properties and environmental operating conditions anticipated during normal ship operations).
- (5) Consideration is to be given to the anticipated behaviours of mooring lines in the event of failure.
- (6) Consideration is to be given to the influence on stored energy and the potential for snap-back of high stiffness mooring lines caused by the use of tails.
- (7) As far as possible, but at least for lines in the same service (e.g. headlines, breast lines or springs), Mooring lines of the same diameter and type (i.e. material) are to be used.

14.4.4.4 Technical specification documents for mooring lines

The technical specification documents of the mooring lines provided on board are to include the manufacturer recommended minimum diameters (D) for fittings in contact with mooring lines and the Line Design Break Forces ($LDBF$) for mooring lines. The properties of mooring lines related to $LDBF$ and bend radius (i.e. the D/d ratio) are to also be included for confirmation of appropriate mooring line selection.

14.4.4.5 Working Load Limit (WLL)

The WLL of mooring lines is to be used as user operating limiting values and is not to be exceeded. WLL is expressed as a percentage of MBL_{sd} and is to be used as a limiting value in operational mooring analyses. Steel wires have a WLL of 55 % of MBL_{sd} and all other cordage (synthetic) have a WLL of 50 % of the MBL_{sd} .

Part CS HULL CONSTRUCTION AND EQUIPMENT OF SMALL SHIPS

Chapter 23 EQUIPMENT

23.2 Towing and Mooring Fittings

23.2.1 General

Sub-paragraph -3 has been amended as follows.

3 The definitions of terms which appear in this section are as follows.

((1) to (13) are omitted.)

(14) Mooring area

“Mooring area” refers to the dedicated area on a ship where mooring equipment is installed and line-handling takes place. It also includes areas where there is a risk of personnel injury in event of snap-back or other failure of mooring equipment.

(15) Working Load Limit (*WLL*)

“Working Load Limit (*WLL*)” means the maximum load that a mooring line should be subjected to in operational service, calculated from the relevant environmental mooring restraint requirement.

(16) Bend radius (*D/d* ratio)

“Bend radius (*D/d* ratio)” means the diameter (*D*) of a mooring fitting divided by the diameter (*d*) of a mooring line that is led around or through the fitting.

23.2.5 Mooring Lines

Sub-paragraph -1(3) has been amended as follows.

1 General

((1) and (2) are omitted.)

(3) Fibre ropes used for mooring lines are to be not less than 20 mm in diameter. ~~For considering rope age degradation and wear, the line design break force for such ropes is to be in accordance with the following (a) or (b). However, neither (a) nor (b) need to be complied with in cases where consideration of rope age degradation and wear is included in the method specified in 23.2.4-3.~~

~~(a) Polyamide ropes: $LDBF \geq 120\%$ of MBL_{red}~~

~~(b) Other synthetic ropes: $LDBF \geq 110\%$ of MBL_{red}~~

((4) and (5) are omitted.)

Sub-paragraph -4 has been added as follows.

4 The arrangement and selection of mooring lines is to in accordance with 14.4.4, Part 1, Part C.

23.2.6 Mooring Fittings

Sub-paragraph -7 has been added as follows.

7 The arrangement and selection of mooring equipment, capstans, and winches are to be in accordance with 14.4.4, Part 1, Part C.

23.2.9 Towing and Mooring Arrangement Plan

Sub-paragraph -2 has been amended as follows.

2 Information provided on the plan is to include the followings:

((1) to (6) are omitted.)

(7) Winch brake holding capacities

(8) For ships of 3,000 gross tonnage and above, documentation confirming that *MSC.1/Circ.1619* has been considered.

(9) The length of each mooring line

(~~7~~10) Other information or notes related to the design of shipboard fittings or lines.

Part D MACHINERY INSTALLATIONS

Chapter 16 WINDLASSES AND MOORING WINCHES

16.3 Mooring Winches

Paragraph 16.3.3 has been added as follows.

16.3.3 Selection of Mooring Winches

Selection of mooring winches is to be in accordance with 14.4.4.3-1, Part 1, Part C.

Part L EQUIPMENT

Chapter 5 FIBRE ROPES

5.1 Fibre Ropes

Paragraph 5.1.7 has been amended as follows.

5.1.7 Breaking Tests*

Breaking tests for fibre ropes are to be carried out in accordance with the following requirements in (1) to (7):

((1) to (3) are omitted.)

- (4) ~~Specimens for polyethylene and polypropylene ropes are to be subjected to breaking tests in as wet condition immediately after having been immersed in warm water at $35 \pm 2^\circ\text{C}$ for more than 30 minutes. For other fibre ropes than the above ropes, specimens are to be subjected to breaking tests in as dried condition.~~ Fibre ropes are, in principle, to be subjected to breaking tests at room temperature in as dried condition and on the spliced rope. Nylon ropes are to be subjected to breaking tests at room temperature in as wet condition immediately after having been immersed in water at normal temperature for more than 30 minutes.
- (5) The load at the time of breaking is not to be less than ~~given in Table L5.1~~ the loads guaranteed by manufacturers.
- (6) Where the breaking tests carried out in accordance with the requirement in (2) fail to meet ~~the requirement given in Table L5.1~~ the load guaranteed by the manufacturer, the coil is to be rejected. Then, two further specimens taken from two coils of the remaining ropes selected at random by the Surveyor may be subjected to the breaking test specified in (3) and (4). If both of these additional tests meet the requirement, the remaining ropes may be accepted. If one or both of additional tests are unsatisfactory, the remaining ropes are, also, to be rejected.
- (7) Where the test load ~~specified in Table L5.1~~ guaranteed by manufacturers can not be applied to specimen for the lack of capacity of testing machine, any other alternative test procedure approved by the Society may be adopted.

Table L5.1 — Breaking Test Loads for Fibre Ropes (kN)

Diameter of rope (mm)	Hemp rope ⁽¹⁾	Synthetic fibre rope							
		Vinylon ⁽¹⁾		Polyethylene ⁽²⁾		Poly- ester ⁽¹⁾	Polypropylene ⁽²⁾		Poly- amide ⁽¹⁾
		Grade 1	Grade 2	Grade 1	Grade 2		Grade 1	Grade 2	
10	7.06	9.32	15.7	9.71	12.7	15.6	10.8	12.7	18.1
12	9.90	13.4	21.8	13.9	17.7	22.0	15.7	17.7	27.5
14	13.1	17.9	28.4	18.6	23.5	29.2	20.6	23.5	36.6
16	16.9	22.9	36.3	23.8	29.4	37.5	26.5	29.4	46.9
18	21.0	28.6	45.1	29.7	37.3	46.7	32.4	37.3	58.2
20	25.6	34.8	54.9	36.1	44.1	56.8	39.2	44.1	70.9
22	30.5	41.6	65.7	43.1	54.9	67.8	47.1	54.9	84.6
24	35.9	48.8	77.5	50.7	63.7	79.6	54.9	63.7	100
26	41.6	56.7	89.2	58.8	73.5	92.4	63.7	73.5	116
28	47.8	65.1	103	67.5	83.4	106	73.5	83.4	132
30	54.3	74.0	117	76.8	97.1	121	83.4	97.1	151
32	61.2	83.5	131	86.5	108	136	94.1	108	170
35	72.3	99.0	155	102	127	161	111	127	201
40	95.4	127	198	131	164	206	142	164	258
45	119	157	247	163	203	260	177	203	321
50	144	191	300	198	250	312	214	250	390
55	173	228	358	237	294	373	255	294	466
60	203	269	421	279	348	438	300	348	547
65	235	312	487	324	402	508	348	402	635
70	271	358	559	371	461	583	399	461	729
75	307	407	635	422	525	663	453	525	829
80	346	459	716	476	593	747	511	593	935
85	387	514	801	533	667	837	572	667	1,050
90	431	571	895	592	735	931	635	735	1,170
95	477	632	981	655	814	1,030	702	814	1,280
100	525	694	1,080	721	897	1,140	772	897	1,410

Notes:

(1) Breaking load at room temperature in dried condition.

(2) Breaking load at room temperature after having been immersed in warm water at $35 \pm 2^\circ\text{C}$ for more than 30 minutes.

“Rules for the survey and construction of passenger ships” has been partly amended as follows:

Part 2 CLASS SURVEY

Chapter 2 CLASSIFICATION SURVEYS

2.1 Classification Survey during Construction

Paragraph 2.1.3 has been amended as follows.

2.1.3 Submission of Other Plans and Documents

With respect to ships intended to undergo the Classification Survey during Construction, the following plans and documents are to be submitted for reference, in addition to the plans and documents specified in 2.1.2:

((1) to (7) are omitted.)

(8) Technical specification documents for the mooring lines (14.4.4.4, Part 1, Part C of the Rules for the Survey and Construction of Steel Ships)

(8) Submission of other plans and documents than those specified in (1) to (7) may be required where deemed necessary by the Society.

2.1.7 Documents to be Maintained On Board*

Sub-paragraph -1 has been amended as follows.

1 At the completion of a classification survey, the Surveyor confirms that the following drawings, plans, manuals, lists, etc., as applicable, of finished version are on board.

((1) is omitted.)

(2) Other documents

((a) to (o) are omitted.)

(p) Management plans for inspection and maintenance of mooring equipment (including mooring lines)

(q) Technical specification documents for the mooring lines (14.4.4.4, Part 1, Part C of the Rules for the Survey and Construction of Steel Ships)

((3) is omitted.)

“Guidance for the survey and construction of steel ships” has been partly amended as follows:

Part B CLASS SURVEYS

B2 CLASSIFICATION SURVEYS

B2.1.6 Documents to be Maintained On Board

Sub-paragraph -11 has been added as follows.

11 The management plans for inspection and maintenance of mooring equipment (including mooring lines) specified in 2.1.6-1.(2)(v), Part B of the Rules are to be prepared in accordance with MSC.1/Circ.1620 and are to include the following (1) to (6).

- (1) Procedures for mooring equipment (including mooring lines) operations, inspection and maintenance.
- (2) Procedures to allow the identification and management of mooring lines, tails and associated attachments.
- (3) Manufacturer criteria for mooring line replacement.
- (4) Records of the original mooring design concepts, equipment, arrangements and specifications. For ships the keels of which were laid before 1 January 2007 and which are without appropriate documentation, MBL_{sd} should be established in accordance with the following (a) and (b).
 - (a) MBL_{sd} should be established based on the Safe Working Load (*SWL*) of the mooring equipment provided on board.
 - (b) If no safe working load is specified, the strength of the mooring equipment and its supporting hull structure should be checked based on 14.4.3, Part1, Part C of the Rules and determine MBL_{sd} based on the actual capacity of the equipment on board and its supporting hull structure.
- (5) Manufacturers' test certificates for mooring lines, joining shackles and synthetic tails
- (6) Records of mooring equipment inspections and maintenance, and mooring line inspections and replacement.

Part C HULL CONSTRUCTION AND EQUIPMENT

Part 1 GENERAL HULL REQUIREMENTS

C14 EQUIPMENT

C14.4 Towing and Mooring Arrangement

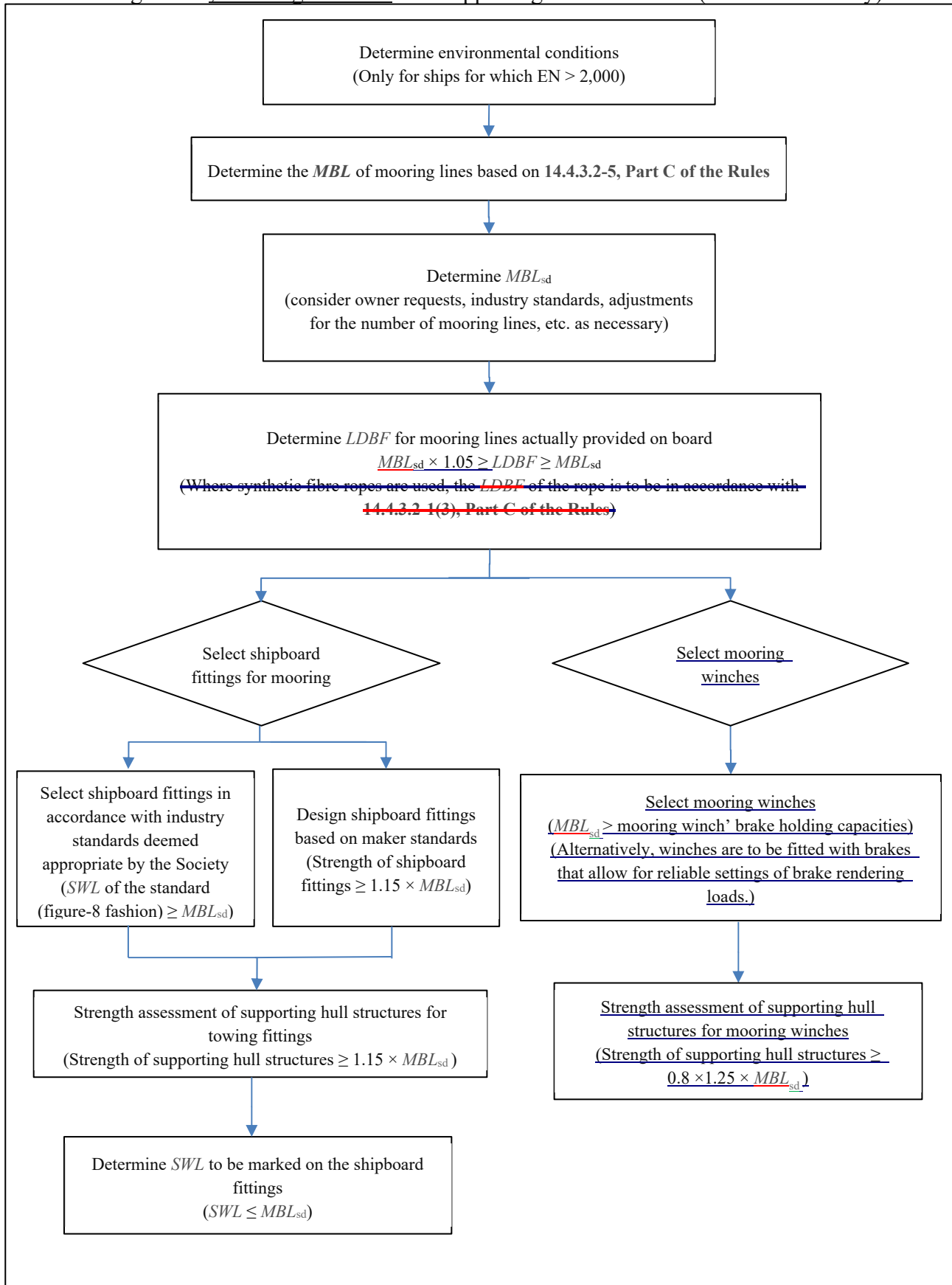
C14.4.1 General

C14.4.1.1 Applications and Definitions

Fig. C14.4.1-2 has been amended as follows.

2 The design process for the mooring fittings including the mooring lines is shown in **Fig. C14.4.1-2**. This flow chart is a standard method for the selection of the mooring line and mooring fittings, and for the design of the mooring fittings and their supporting hull structures, and is not intended to cover everything that may be expected at the time of newbuilding or in service of ships.

Fig. C14.4.1-2 Standard Design and Selection Process for Mooring Lines, Mooring Arrangements, Mooring Winches and Supporting Hull Structures (for reference only)



Part O WORK-SHIPS

O4 VESSELS ENGAGED IN TOWING OPERATION

O4.2 Stability

O4.2.1 General

Sub-paragraph (4) has been amended as follows.

Ships engaged in towing operations are to comply with the following requirements or the requirements given in **Annex O4.2.1“GUIDANCE FOR INTACT STABILITY FOR SHIPS ENGAGED IN TOWING OPERATIONS”**, in addition to the requirements of 2.2.1, **Part U of the Rules**.

- (4) In principle, ~~ships~~ towing winches are to be provided with an appropriate device being capable of releasing the towing cable in an instant. Notwithstanding the above, towing winches of ships only engaged in coasting service or equivalent (except for winches to which 4.4.2-3, Part O of the Rules applies), such device may be dispensed with, provided that appropriate safety procedures for emergency are to be stated in the ship's stability information.

“Guidance for the survey and construction of passenger ships” has been partly amended as follows:

Part 2 CLASS SURVEY

Chapter 2 CLASSIFICATION SURVEYS

2.1 Classification Survey during Construction

Paragraph 2.1.7 has been amended as follows.

2.1.7 Documents to be Maintained On Board

1 The certificates specified in **2.1.7-5, Part 2 of the Rules** are those such as the ones issued for each piece of equipment, device, etc., type approval certificates valid at the time of the Classification Survey, or others applicable. With regard to fire pumps, hose test records after installation on board may be accepted. In addition, unless equipment or devices on board are renewed after the ship has entered service, these certificates need not be updated.

2 The management plans for inspection and maintenance of mooring equipment (including mooring lines) specified in 2.1.7-1.(2)(p), Part 2 of the Rules are to be prepared in accordance with MSC.1/Circ.1620 and are to include the following (1) to (6).

- (1) Procedures for mooring equipment (including mooring lines) operations, inspection and maintenance.
- (2) Procedures to allow the identification and management of mooring lines, tails and associated attachments.
- (3) Manufacturer criteria for mooring line replacement.
- (4) Records of the original mooring design concepts, equipment, arrangements and specifications. For ships the keels of which were laid before 1 January 2007 and which are without appropriate documentation, MBL_{sd} should be established in accordance with the following (a) and (b).
 - (a) MBL_{sd} should be established based on the Safe Working Load (SWL) of the mooring equipment provided on board.
 - (b) If no safe working load is specified, the strength of the mooring equipment and its supporting hull structure should be checked based on 14.4.3, Part 1, Part C of the Rules and determine MBL_{sd} based on the actual capacity of the equipment on board and its supporting hull structure.
- (5) Manufacturers' test certificates for mooring lines, joining shackles and synthetic tails
- (6) Records of mooring equipment inspections and maintenance, and mooring line inspections and replacement.

“Guidance for the approval and type approval of materials and equipment for marine use” has been partly amended as follows:

Part 2 EQUIPMENT

Chapter 5 APPROVAL OF MANUFACTURING PROCESS OF SYNTHETIC FIBRE ROPES

5.4 Approval Test

5.4.1 Test Items

Sub-paragraph -3(1) has been amended as follows.

3 The test procedures for -1 above are to be in accordance with the following requirements:

(1) Tensile tests in wet and dry conditions

Tensile tests on three each test specimens are to, in principle, be carried out for each of the test conditions given in **Table 2.5-1**, and breaking strength and elongation are to be measured. ~~Except on cases with vinylon and nylon in wet condition,~~ Respective breaking loads are to satisfy ~~the requirements specified in Table L5.1, Part L of the Rules~~ the loads guaranteed by manufacturers. ~~The breaking loads of vinylon and nylon in wet conditions are to be 80% or more and 90% or more respectively of the values given in the Table L5.1, Part L of the Rules.~~ Values with respect to elongation are to be for reference only. The gauge length of the test specimen to be 30 times or more the rope diameter, however it needs not to exceed 1 *meter*.