TÜRK LOYDU RULE CHANGE SUMMARY

TL NUMBER: 05/2021 DEC 2021

Latest editions of TL Rules incorporate all rule changes. The latest rule revisions of a published rule are shown with a vertical line. Changes after the publication of the rule are written in red colour.

Please note that within this document added items are written in red and for deleted items strikethrough is applied. After the publication of relevant rule, those revisions are to be indicated with a vertical line. Following Rule Changes presented in English are also implemented into Turkish Version of Rules.

RULE CHANGE SUMMARY

CLASSIFICATION AND SURVEYS

No	Item
01	Section 1
02	Section 2
03	Section 3

CHAPTER 1 – HULL

01	Section 2
02	Section 3
03	Section 6
04	Section 8
05	Section 13

CHAPTER 4-1 – AUTOMATION

01	Section 1
02	Section 5

CHAPTER 5 – ELECTRICAL INSTALLATION

01	Section 1
02	Section 8
03	Section 12
04	Section 15
05	Section 20

CHAPTER 7 – HIGH SPEED CRAFTS

01	Section 3
02	Annex 9

CHAPTER 28 – VENTILATION

01	Section 1

CHAPTER 37 – TENTATIVE RULES FOR THE CLASSIFICATION OF PASSENGER CRAFT

01	Section 7

CHAPTER 53 – SUBMERSIBLES

01	Section 1

CHAPTER 70 – MULTI-POINT MOORING SYSTEMS

01	Section 4

CHAPTER 101 – NAVAL SHIP TECHNOLOGY, CLASSIFICATION AND SURVEYS

01	General

CHAPTER 102 – NAVAL SHIP TECHNOLOGY, HULL STRUCTURES AND SHIP EQUIPMENT

01	General

CLASSIFICATION AND SURVEYS

01. Section 1 – General Tems and Conditions

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item J was added as below:

J. Safety and Environment

TL and the Client shall promote safety, health and environmental protection and create safe working conditions for their personnel.

The Client shall guarantee safe work environment in accordance with applicable local laws and regulations as well as Rules for **TL** surveyors and shall adopt all necessary measures to mitigate and/or control any relevant risk.

The Client shall immediately inform **TL;** for any actual or potential risks which Client is aware in the work areas where the Surveyor will be required to operate and relevant to the performance of the Work as well as any implemented or planned safety measure that **TL** Surveyor is requested to comply with.

TL and/or **TL**'s Surveyor are entitled to refuse commencing and/or suspending the Services in case they consider at their own discretion that the safety requirements stated in this item are not satisfactorily met. Any such decision shall suspend both parties' obligations under the Contract without any liability or penalties until the parties mutually agree on further proceedings. In case such mutual agreement is not reached, **TL** may terminate the Services, in which case **TL** shall be entitled to receive payment for the already provided Services in proportion to the total Service Fee.

02. Section 2 - Classification

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Table 2.12 was revised as below:

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POWER PLANT SHIP	Ships specially equipped for power generation	Power plant ship	~~Case by case~~ Guidelines for Power Plant Ships	Case by case

Table 2.33 was revised as below:

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
R	For ships provided with a system for remote control of the main propulsion plant from the bridge		Part B Chapter 4-1, Section 5, A	
(1) *nh indicates that machinery spaces may be unattended for n hours.*				

03. Section 3 - Surveys

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item A.4.7.3 was revised as below:

4.7.3 One bottom survey is to be carried out in conjunction with the class renewal survey i.e. not more than 15 months prior to the expiry date of the classification certificate.

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item A.10.4 was revised as below:

10.4 If for some reason a vessel's class has expired or has been withdrawn by **TL**, all statutory certificates issued by **TL** will automatically become void. ~~If subsequently the class is renewed or reassigned, validity of these certificates will within the scope of its original period of validity be revived, provided that all surveys meanwhile having fallen due have been carried out.~~

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item A.11.2.1.1 and A.11.2.1.2 was revised acoording to UR Z17 Rev.16 as below:

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- Firms engaged in Commissioning Testing of Ballast Water Management System (BWMS)

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- Firms engaged in Watertight Cable Transit Seal Systems inspection on ships and Mobile Offshore Units.

PART A – CHAPTER 1 – HULL

01. Section 2 - Habitability

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item B.1.2 was revised acoording to Rec. 167 as below:

1.2 Vibration standards for the main and auxiliary ship machinery and equipment are specified in Section 19. A and **TL** Chapter 4, Machinery, Section 1, D.4, for main shafting in Section 5.D and for torsional vibration in Section 6. Similarly, the vibration standards for ship's electronic devices are given in Section 1, F.1. TL-G 167 may be considered for identifying vibration problems in hull structures on newly built or in-service vessels and for common remedial actions to make improvements to address those problems.

02. Section 3 – Design Principles

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Figure 3.1 was revised acoording to UR S6 Rev.9 Corr.2 as below:

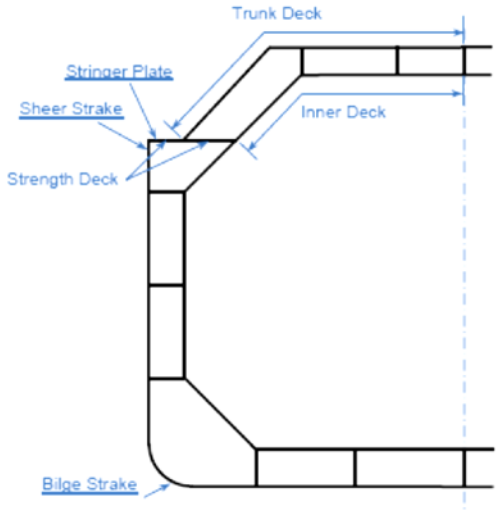

Table 3.5 was revised acoording to UR S6 Rev.9 Corr.2 as below:

Table 3.5 Minimum material grades for ships with length exceeding 250 m

Structural member category	Material grade
Shea~~e~~r strake at strength deck **(1)**	Grade E/EH within 0.4 L amidships
Stringer plate in strength deck **(1)**	Grade E/EH within 0.4 L amidships
Bilge strake **(1)**	Grade D/DH within 0.4 L amidships
(1) *Single strakes required to be of Grade D/DH or Grade E/EH as shown in the above table and within 0.4 L amidships are to have breadths not less than 800 + 5 L [mm], need not be greater than 1800 mm, unless limited by the geometry of the ship's design.*	

03. Section 6 - Longitudinal Strength

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item H.3.1.1 was revised acoording to UR S11 Rev.10 as below:

Annex 1 of TL-R S11 contains the guidance for partially filled ballast tanks in ballast loading conditions.

04. Section 8 – Supporting Structures

Revision Date: Septeember 2021

Entry into Force Date: 1 January 2022

Item D.2.4 was revised acoording to UR A1 Rev.7 as below:

2.4 Supporting Hull Structures of Anchor Windlasses and Chain Stoppers

The supporting hull structure of anchor windlass and chain stopper is to be sufficient to accommodate the design and sea loads.

~~**2.4.1 For the supporting structure under windlasses and chain stoppers, the following permissible stresses are to be observed:**~~

~~bending stress : $\sigma_b = \frac{200}{k}$ [N/mm^2]~~

~~shear stress : $\tau = \frac{120}{k}$ [N/mm^2]~~

~~equivalent stress : $\sigma_V = \sqrt{\sigma_b^2 + 3\tau^2} = \frac{220}{k}$ [N/mm^2]~~

2.4.1 The acting forces (operating loads) are to be calculated for 80 % and 45 % respectively of the rated breaking load of the chain cable, i.e.::

for chain stoppers 80 %

for windlasses 80 %, where chain stoppers are not fitted or the chain stopper is attached to the windlass.

45 %, where chain stoppers are fitted but not attached to the windlass.

The design loads are to be applied in the direction of the chain cable.

2.4.2 Sea loads are to be taken according to Chapter 4, Sec. 11, A.4.3.1.

2.4.3 The stresses acting on the supporting hull structures of windlass and chain stopper based on net thickness obtained by deducting the corrosion addition, t_c, given in 2.4.4, are not to be greater than the following permissible values:

(a) For strength assessment by means of beam theory or grillage analysis:

- Normal stress: 1.0 R_{eH}
- Shear stress: 0.6 R_{eH}

The normal stress is the sum of bending stress and axial stress. The shear stress to be considered corresponds to the shear stress acting perpendicular to the normal stress. No stress concentration factors are to be taken into account.

(b) For strength assessment by means of finite element analysis:

- Von Mises stress: 1.0 R_{eH}

For strength assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry as realistically as possible. The aspect ratios of elements are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs, the web thickness is to be reduced to a mean thickness over the web height as per **TL** rules. Large openings are to be modelled. Stiffeners may be modelled using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modeled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element.

R_{eH} is the specified minimum yield stress of the material.

2.4.4 The total corrosion addition, tc, is not to be less than the following values:

(a) Ships covered by Common Structural Rules for Bulk Carriers and Oil Tankers:

t_c: total corrosion addition as defined in these rules.

(b) For the supporting hull structure, the total corrosion addition, tc, is defined according to **TL**'s Rules for all considered structural members used in the model (e.g. deck structures).

05. Section 13 – Superstructures and Deckhouses

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item A.5 was revised as below:

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For ferries, ro-ro and ro-ro passenger ships, PCTC (Pure Car and Truck Carriers) vessels and other vessels which are generally characterised by either a reduced number or absence of structural transverse bulkheads the strength of structure above the bulkhead deck under transversal loads is to be carefully investigated by using racking FEM analysis, paying special attention to the following key factors:

- connection of decks to the front bulkhead and the transom bulkhead
- structural continuity of transverse/vertical members through the freeboard deck.
- Primary members are also to be checked against racking.

06. Section 16 – Hull Outfitting

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item D.3 was revised as below:

3.1 The thickness of air pipes in position 1 and 2 leading to spaces below the freeboard deck or to spaces within closed superstructures is not to be less than given in the following:

~~3.1~~ - For pipes having external diameter equal to or less than 80 mm, thickness should not be less than 6 mm.

~~3.2~~ - For pipes having external diameter equal to or more than 165 mm, thickness should not be less than 8.5 mm.
Intermediate sizes should be determined by linear interpolation.

3.2 The thickness of air pipes other than specified above 3.1 is not to be less than given in the following:
- For pipes having external diameter equal to or less than 155 mm, thickness should not be less than 4.5 mm.
- For pipes having external diameter equal to or more than 230 mm, thickness should not be less than 6 mm.
Intermediate sizes should be determined by linear interpolation.

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item E.3 was revised as below:

3.1 The thickness of ventilator coamings in position 1 and 2 leading to spaces below the freeboard deck or to spaces within closed superstructures is not to be less than given in the following:

~~3.1~~ - For coamings having external diameter equal to or less than 80 mm, thickness should not be less than 6 mm.
~~3.2~~ - For coamings having external diameter equal to or more than 165 mm, thickness should not be less than 8.5 mm.
Intermediate sizes should be determined by linear interpolation.

3.2 The thickness of ventilator coamings other than specified above 3.1 is not to be less than given in the following:

- For coamings having external diameter equal to or less than 155 mm, thickness should not be less than 4.5 mm.
- For coamings having external diameter equal to or more than 230 mm, thickness should not be less than 6 mm.
Intermediate sizes should be determined by linear interpolation.

3.3 The wall thickness of ventilator posts of a clear sectional area exceeding 1600 cm^2 is to be increased according to the expected loads.

3.4 Where the thickness of the deck plating is less than 10 mm, insert plate of 10 mm thickness is to be fitted. Their side lengths are to be equal to twice the length or breadth of the coaming.

07. Section 17 - Equipment

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item A.2.1 was revised and item A.2.6 was added according to UR A1 as below:

2.1 The anchoring equipment required by this Section is intended of temporary mooring of a vessel within a harbour or sheltered area when the ship is awaiting berth, tide, etc. TL-G 10 'Anchoring, Mooring and Towing Equipment' may be referred to for recommendations concerning anchoring equipment for ships in deep and unsheltered water.

2.6 Manufacture of anchors and anchor chain cables is to be in accordance with TL-R W29 and TL-R W18.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item B.1 was revised acoording to UR A1 Rev.7 as below:

$EN = D^{2/3} + 2.0\ (h\ B + S_{fun}) + A/10$

h = Effective height from the summer load waterline to the top of the uppermost house [m]; ~~for the lowest tier "h" is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure below for an example.~~

Item B.1 was revised acoording to UR A1 Rev.7 Corr.1 as below:

a = Vertical distance at hull side, in [m], from the summer load waterline, amidships, to the upper deck ~~at side~~ .

Item B.1 was revised acoording to UR A1 Rev.7 as below:

h_i = Height in [m] on the centreline of each tier of houses having a breadth greater than B/4, for the lowest tier h_1 is to be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure 17.2 below for an example,

S_{fun} = effective front projected area of the funnel [m^2], defined as:

$$S_{fun} = A_{FS} - S_{shield}$$

A_{FS} = front projected area of the funnel [m^2], calculated between the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.

A_{FS} is taken equal to zero if the funnel breadth is less than or equal to B/4 at all elevations along the funnel height.

h_F = effective height of the funnel, in m, measured from the upper deck at centreline, or notional deck line where there is local discontinuity in the upper deck, and the top of the funnel. The top of the funnel may be taken at the level where the funnel breadth reaches B/4

S_{shield} = the section of front projected area A_{FS}, in m^2, which is shielded by all deck houses having breadth greater than B/4. If there are more than one shielded section, the individual shielded sections i.e $S_{shield1}$, $S_{shield2}$ etc as shown in figure 17.3 to be added together. To determine S_{shield}, the deckhouse breadth is assumed B for all deck houses having breadth greater than B/4 as shown for $S_{shield1}$, $S_{shield2}$ in figure 17.3.

A = Side projected area in [m^2] of the hull, superstructures ~~and~~, houses and funnels ~~having a breadth greater than B/4,~~ above the summer load waterline which are within the equipment length of the ship and also have a breadth greater then B/4. The side projected area of the funnel is considered in A when A_{FS} is greater than zero. In this case, the side projected area of the funnel should be calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.

Figure was numbered as Figure 2 and revised acoording to UR A1 Rev.7 as below:

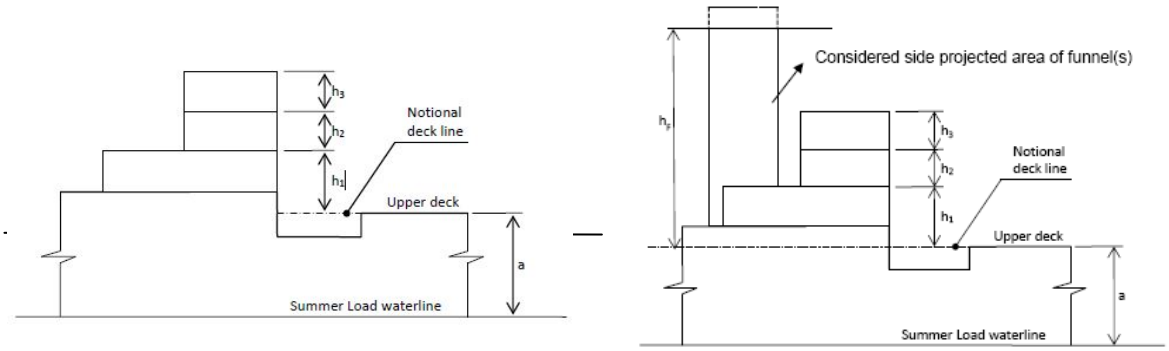
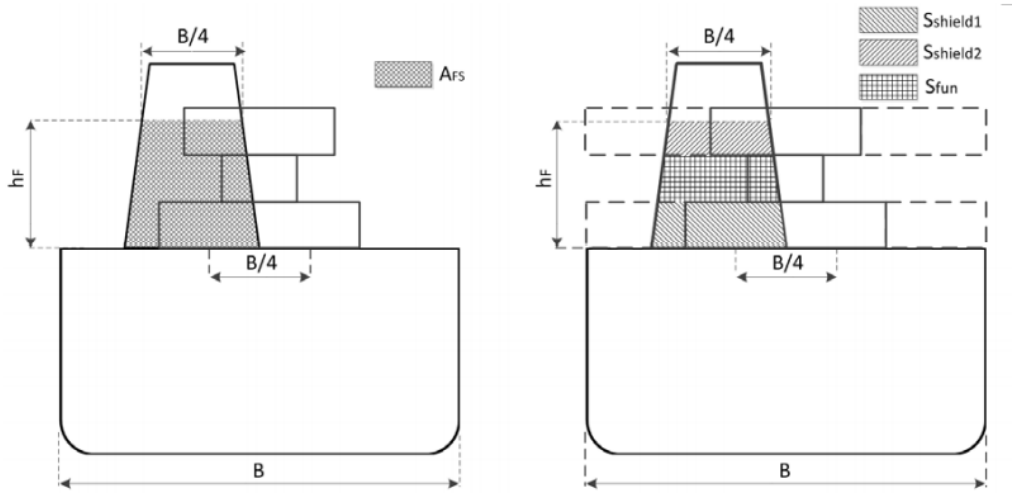


Figure 3 was added and subsequent figures were renumbered and given reference to figures were revised acoording to UR A1 Rev.7 as below:



Note 5 was added acoording to UR A1 Rev.7 as below:

5. *When several funnels are fitted on the ship, the above parameters are taken as follows:*

h_F*:* *effective height of the funnel, in m, measured from the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the top of the highest funnel. The top of the highest funnel may be taken at the level where the sum of each funnel breadth reaches B/4.*

A_{FS}*:* *sum of the front projected area of each funnel, in m ^{2}, calculated between the upper deck, or notional deck line where there is local discontinuity in the upper deck, and the effective height h_F.*

A_{FS} *is to be taken equal to zero if the sum of each funnel breadth is less than or equal to B/4 at all elevations along the funnels height.*

A: *Side projected area, in m^2, of the hull, superstructures, houses and funnels above the Summer Load waterline which are within the equipment length of the ship. The global total side projected area of the funnels is to be considered in the side projected area of the ship, A, when A_{FS} is greater than zero. The shielding effect of funnels in transverse*

direction may be considered in the total side projected area, i.e., when the side projected areas of two or more funnels fully or partially overlap, the overlapped area needs only to be counted once.

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item C.2.3.1 was revised according to UR A1 as below

A very high holding power anchor is an anchor with a holding power of at least four times that of an ordinary stockless anchor of the same mass. A VHHP anchor is suitable for restricted service vessels' use and is not to require prior adjustment or special placement on the sea bottom.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item F.1.2 was revised and F.1.4 was added acoording to Rec. 10 Rev.4 as below:

1.2 The towing lines given in col. 11 of Table 17.1 are intended as own towline of a ship to be towed by a tug or other ship. The designer should consider verifying the adequacy of towing lines based on assessments carried out for the individual towing arrangement.

1.4 Table 17.1 and Item 3 specify the minimum recommended number and minimum strength of mooring lines. As an alternative, the minimum recommendation for mooring lines may be determined by direct mooring analysis in line with the procedure given in TL-G 10, Appendix A.

The designer should consider verifying the adequacy of mooring lines based on assessments carried out for the individual mooring arrangement, expected shore-side mooring facilities and design environmental conditions for the berth.

Item F.3 was revised acoording to Rec. 10 Rev.4 as below:

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- ~~For oil tankers, chemical tankers, bulk carriers, and ore carriers~~ The lightest ballast draft should be considered for the calculation of the side-projected area A_1. ~~For other ships the lightest draft of usual loading conditions should be considered if the ratio of the freeboard in the lightest draft and the full load condition is equal to or above two. Usual loading conditions mean loading conditions as given by the trim and stability booklet that are to be expected to regularly occur during operation and, in particular, excluding light weight conditions, propeller inspection conditions, etc.~~ For ship types having small variation in the draft, like e.g. passenger and RO/RO vessels, the side projected area A_1 may be calculated using the summer load waterline.

.....

- Deck cargoes ~~as given by the loading manual~~ at the ship nominal capacity condition should be included for the determination of side-projected area A_1. For the condition with cargo on deck, the summer load waterline may be considered**.** Deck cargoes may not need to be considered if ~~a usual light~~ ballast draft condition ~~without cargo on deck~~ generates a larger side-projected area A_1 than the full load condition with cargoes on

deck. The larger of both side-projected areas should be chosen as side-projected area A_1. The nominal capacity condition is defined in G.1.

Item F.3.1 was revised acoording to Rec. 10 Rev.4 as below:

3.1 Ship design minimum breaking ~~strength~~ load

The ship design minimum breaking ~~strength~~ load, in kN, of the mooring lines should be taken as:

$MBL_{SD} = 0,1 \cdot A_1 + 350$

The ship design minimum breaking ~~strength~~ load may be limited to 1275 kN (130 t). However, in this case the moorings are to be considered as not sufficient for environmental conditions given by 3. For these ships, the acceptable wind speed v_w*, in m/s, can be estimated as follows:

$$v^*_w = v_w \sqrt{\frac{MBL^*_{SD}}{MBL_{SD}}}$$

where v_w is the wind speed as per 3. MBL* the ship design minimum breaking ~~strength~~ load of the mooring lines intended to be supplied and MBL the ship design minimum breaking ~~strength~~ load as recommended according to the above formula. However, the ship design minimum breaking ~~strength~~ load should not be taken less than corresponding to an acceptable wind speed of 21 m/s:

$MBL^*_{SD} \geq (21|v_w)^2 \cdot MBL_{SD}$

If lines are intended to be supplied for an acceptable wind speed v_w* higher than v_w as per 3., the ship design minimum breaking ~~strength~~ load should be taken as:

$MBL^*_{SD} \geq (v*_w|v_w)^2 \cdot MBL_{SD}$

Item F.3.2 was revised acoording to Rec. 10 Rev.4 as below:

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The number of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the ~~strength~~ ship design minimum breaking load of the lines. The adjusted ~~strength~~ ship design minimum breaking load MBL_{SD}**, should be taken as:

MBL_{SD} ** = 1,2 · MBL_{SD} · n/n** ≤ MBL_{SD} for increased number of lines,

MBL_{SD} ** = MBL_{SD} · n/n** for reduced number of lines.

where MBL_{SD} is MBL_{SD} or MBL_{SD} * specified in 3.1, as appropriate, n** is the increased or decreased total number of head, stern and breast lines and n the number of lines for the considered ship type as calculated by the above formulas without rounding.

Vice versa, the~~ strength~~ ship design minimum breaking of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines.

The total number of spring lines (see Note in 3.) should be taken not less than:

Two lines where EN < 5000,

Four lines where EN ≥ 5000.

The~~ strength~~ ship design minimum breaking of spring lines should be the same as that of the head, stern and breast lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the ~~strength~~ ship design minimum breaking of the lines, the number of spring lines should be ~~likewise increased~~ taken as follows, but rounded up to the nearest even number.

$$n_S^* = MBL_{SD} / MBL_{SD}^{**} \cdot n_S$$

where MBL_{SD} is MBL_{SD} or MBL_{SD} * specified in 3.1, as appropriate, n_S is the number of spring lines as given above and n_S^* the increased number of spring lines.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item G.1 was revised acoording to UR A2 Rev.5 as below:

……

- The nominal capacity condition is defined as the theoretical condition where the maximum possible deck cargoes are included in the ship arrangement in their respective positions. For container ships the nominal capacity condition represents the theoretical condition where the maximum possible number of containers is included in the ship arrangement in their respective positions.
- Ship Design Minimum Breaking Load (MBLSD) means the minimum breaking load of new, dry mooring lines or tow line for which shipboard fittings and supporting hull structures are designed in order to meet mooring restraint requirements or the towing requirements of other towing service.
- Line Design Break Force (LDBF) means the minimum force that a new, dry, spliced, mooring line will break at. This is for all synthetic cordage materials.

Item G.2.1 was revised acoording to UR A2 Rev.5 as below:

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For fittings intended to be used for, both, towing and mooring, item 3 applies to mooring.

Item G.2.3.2 was revised acoording to UR A2 Rev.5 as below:

2.3.2 For other towing service, the ship design minimum breaking ~~strength~~ load ~~of the tow line~~ according to Table 17.1 for the equipment numeral EN.

Notes under item G.2.3.3 were revised acoording to UR A2 Rev.5 as below:

Notes:

1. *Side projected area including that of deck cargoes as given by the ~~loading manual~~ ship nominal capacity condition is to be taken into account for selection of towing lines and the loads applied to shipboard fittings and supporting hull structures. The nominal capacity condition is defined in item 1.*
2. *The increase of the ~~minimum breaking strength~~ line design break force for synthetic ropes needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structures.*

Item G.2.4.2 was revised acoording to UR A2 Rev.5 as below:

2.4.2 For other towing service, the ship design minimum breaking ~~strength~~ load of the tow line according to Table 17.1 (See notes on 2.3).

Item G.2.5 was revised acoording to UR A2 Rev.5 as below:

2.5 Supporting hull structures

……..

- For strength assessment by means of beam theory or grillage analysis:

Normal stress: 1,0 R_{eH} ~~100% of the specified minimum yield point of the material.~~

Shearing stress: 0,6 R_{eH} ~~60% of the specified minimum yield point of the material.~~

Normal stress is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors being taken into account.

- For strength assessment ~~with~~ by means of finite element analysis:

~~Equivalent~~ Von Mises stress: 1,0 R_{eH} ~~100% of the specified minimum yield point of the material.~~

For strength ~~calculation~~ assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry ~~is to idealized~~ as realistically as possible. The aspect ratios of elements ~~to width is~~ are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height as per **TL** rules. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modeled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element.

R_{eH} is the specified minimum yield stress of the material.

Item G.2.6.1 was revised and 2.6.5 was deleted and subsequent items were renumbered acoording to UR A2 Rev.5 as below:

2.6.1 The safe towing load (TOW) is the safe load limit of shipboard fitting used for towing purpose.

~~**2.6.5** For fittings intended to be used for, both, mooring and towing, 2 applies to mooring.~~

Item G.3.1 was revised acoording to UR A2 Rev.5 as below:

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For fittings intended to be used for, both, mooring and towing, 2 applies to towing.

Items G.3.3.1 and 3.3.2 were revised acoording to UR A2 Rev.5 as below:

3.3.1 The minimum design load applied to supporting hull structures for shipboard fittings is to be 1,15 times the ship design minimum breaking ~~strength of the mooring line~~ load according to Table 17.1.

3.3.2 The minimum design load applied to supporting hull structures for winches, is to be 1.25 times the intended maximum brake holding load where the maximum brake holding load is to be assumed not less than 80% of the ship design minimum breaking ~~strength of the mooring line~~ load according to Table 17.1. For supporting hull structures of capstans, 1.25 times the maximum hauling-in force is to be taken as the minimum design load.

Notes under item G.3.3.4 were revised acoording to UR A2 Rev.5 as below:

1. If not otherwise specified by TL- G 10, side projected area including that of deck cargoes as given by the ~~loading manual~~ ship nominal capacity condition is to be taken into account for selection of mooring lines and the loads applied to shipboard fittings and supporting hull structure. The nominal capacity condition is defined in 1.

2. The increase of the ~~minimum breaking strength~~ line design break force for synthetic ropes needs not to be taken into account for the loads applied to shipboard fittings and supporting hull structures.

Item G.3.4 was revised acoording to UR A2 Rev.5 as below:

Shipboard fittings may be selected from an industry standard accepted by **TL** and at least based on the ship design minimum breaking ~~strength of the mooring line~~ load according to Table 17.1 (See notes on 2.3).

……

Item G.3.5 was revised acoording to UR A2 Rev.5 as below:

3.5 Supporting hull structures

……

- For strength assessment by means of beam theory or grillage analysis:

Normal stress: 1,0 R_{eH} ~~100% of the specified minimum yield point of the material.~~

Shear stress: 0,6 R_{eH} ~~60% of the specified minimum yield point of the material.~~

Normal stress is the sum of bending stress and axial stress ~~with the corresponding shearing stress acting perpendicular to the normal stress~~. No stress concentration factors being taken into account.

- For strength assessment ~~with~~ by means of finite element analysis:

~~Equivalent~~ Von Mises stress: 1,0 R_{eH} ~~100% of the specified minimum yield point of the material.~~

For strength ~~calculation~~ assessment by means of finite element analysis the mesh is to be fine enough to represent the geometry ~~is to idealized~~ as realistically as possible. The aspect ratios of elements ~~to width is~~ are not to exceed 3. Girders are to be modelled using shell or plane stress elements. Symmetric girder flanges may be modelled by beam or truss elements. The element height of girder webs must not exceed one-third of the web height. In way of small openings in girder webs the web thickness is to be reduced to a mean thickness over the web height as per **TL** rules. Large openings are to be modelled. Stiffeners may be modelled by using shell, plane stress, or beam elements. The mesh size of stiffeners is to be fine enough to obtain proper bending stress. If flat bars are modeled using shell or plane stress elements, dummy rod elements are to be modelled at the free edge of the flat bars and the stresses of the dummy elements are to be evaluated. Stresses are to be read from the centre of the individual element. For shell elements the stresses are to be evaluated at the mid plane of the element.

R_{eH} is the specified minimum yield stress of the material.

Items G.3.6.1 and 3.6.2 were revised acoording to UR A2 Rev.5 as below:

3.6.1 The Safe Working Load (SWL) is the safe load limit of shipboard fittings used for mooring purpose.

3.6.2 Unless a greater SWL is requested by the applicant according to 3.3.3, the SWL is not to exceed the ship design minimum breaking ~~strength of the mooring line~~ load according to Table. 17.1.

Item G.4.2.5 was revised acoording to UR A2 Rev.5 as below:

4.2.5 Manner of applying towing or mooring line load including limiting fleet angle~~s~~, i.e. angle of change in direction of a line at the fitting.

Items G.4.3.2 and 4.3.3 were revised acoording to UR A2 Rev.5 as below:

4.3.2 the ship design minimum breaking ~~strength of each mooring line~~ load (MBL_{SD}),

4.3.3 the acceptable environmental conditions, refer for minimum conditions to ~~as given in~~ TL- G 10 “Anchoring, Mooring and Towing Equipment” for the recommended ship design minimum breaking ~~strength of mooring line~~ load for ships with Equipment Number EN > 2000:

Items G.5 and 5.1 were revised acoording to UR A2 Rev.5 as below:

5. Corrosion Addition

The total corrosion addition, t_K, is not to be less than the following values:

5.1 Ships covered by Common Structural Rules for Bulk Carriers and Oil Tankers: t_K, total corrosion addition to be as defined in these rules.

08. Section 21 – Structural Fire Protection

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item B.4.2.2.[9] was revised acoording to MSC.1/Circ.1634 as below:

- Isolated pantries containing no cooking appliances in accommodation spaces.

  See also MSC.1/Circ.1634 for interpretation.

Item B.13.1.4 was revised acoording to UI SC 126 Rev.1 as below:

13.1.4 Application details to be in accordance with FTP Code 2010, Annex-4 and TL-I SC126.

Item B.13.5.1 was revised acoording to UI SC 126 Rev.1 as below:

……

On passenger ships, paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with the FTP Code 2010. Application details to be in accordance with FTP Code 2010, Annex-4 and TL-I SC126.

……

Items C.9.1.3 and 9.3.1 were revised acoording to UI SC 126 Rev.1 as below:

9.1.3 Application details to be in accordance with FTP Code 2010, Annex-4 and TL-I SC126.

9.3.1 Paints, varnishes and other finishes

Paints, varnishes and other finishes used on exposed interior surfaces are not to be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with FTP Code 2010. Application details to be in accordance with FTP Code 2010, Annex-4 and TL-I SC126.

09. Section 26 - Stability

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Note under item A.2.25 was revised acoording to MSC.1/Circ.1537/Rev.1 as below:

Note: *In applying down-flooding angle, openings which cannot be or are incapable of being closed weathertight include ventilators (complying with ILLC 19(4)) that for operational reasons have to remain open to supply air to the engine room, emergency generator room or closed ro-ro and vehicle spaces (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship. Where it is not technically feasible to treat some closed ro-ro and vehicle space ventilators as unprotected openings, Administrations may allow an alternative arrangement that provides an equivalent level of safety.*

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item B.11.1.4 was revised acoording to MSC.1/Circ.1537/Rev.1 as below:

……

φ_f = Angle of heel at which openings in the hull, superstructures or deckhouses which cannot be closed weathertight immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open,

Note: See also item A.2.25.

φ_c = Angle of second intercept between wind heeling lever l_{w2} and GZ curve.

10. Section 28 – Oil Tankers

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item E.1.1.2 was revised acoording to MSC 62(67)/Rev.1 as below:

1.1.2 Be fitted at each side throughout its length with a footstep and guard rails supported by stanchions. Such rails should consist of no less than 3 courses, the lowest being not more than 230 mm. and the uppermost being at least 1 m above the gangway or walkway, and no intermediate opening should be more than 380 mm. in height. Stanchions should be at intervals of not more than 1.5 m. A permanent walkway located at the freeboard deck level, on or as near as practicable to the centreline of the ship, need not be fitted with foot-stops;

11. Section 29 - Tugs

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item A.3 was revised as below:

3.1 In addition to the documents listed in Section 1÷21, the following documents are to be submitted for approval:

- Structural drawings of winch and/or towing hook or chain stopper
- Structural drawings of attachments to the hull structure
- ~~Bollard pull test programme~~

3.2 The following documents are to be submitted for information:

- Arrangement of towing equipment
- Calculation of the towing design force and required bollard pull.
- Strength calculation of the winch and/or hook.
- The bollard pull test procedure is to be as given in D,6.2.2.

3.3 The bollard pull of the vessel is to be obtained by a special test ~~approved~~ witnessed by **TL** Surveyor.

~~The bollard pull test procedure is to be as given in D,6.2.2.~~

……

12. Annex B

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Table was revised as below:

Sub-section	Paragraph	Applicable to CSR Vessels	Remarks
Section 17 – Equipment			
A. General		~~N~~ Y	
B. Equipment Number		~~N~~ Y	
C. Anchors		~~N~~ Y	
D. Anchor Chain Cables		~~N~~ Y	
E. Installation of The Chain Cables on Board		~~N~~ Y	
F. Mooring And Towing Equipment		~~N~~ Y	
G. Shipboard Fittings and Supporting Hull Structures Associated with Mooring on Conventional Ships		~~N~~ Y	

PART A – CHAPTER 2 – MATERIAL

01. Section 2 - Mechanical and Technological Testing Procedures

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Items H.11.1.1, 11.3 and 11.4 were revised as below:

11.1.1 Ultrasonic testing is to be performed with the impulse echo technique in accordance with recognized standards. Such are e.g. EN 12223, EN ISO 7963, ~~EN 12668~~ ISO 22232-3, ISO 16810, EN 10228-3, EN 10160 and EN 12680-1.

……

11.3 Test appliances and accessories

Ultrasonic testing appliances and probes shall comply with the state of the art and with recognized standards (*e.g.* ~~EN 12668~~ *ISO 22232-1,* ~~EN 12668~~ *ISO 22232-2 and* ~~EN 12668~~*ISO 22232-3)* and shall fulfill at least the following requirements:

11.4 Calibration blocks

For verification of the inspection system calibration blocks type 1 according to ~~DIN EN 12223~~ ISO 2400 and calibration blocks type 2 according to EN ISO 7963 or other adequate calibration blocks with reference reflectors are to be used.

02. Section 5 – Steel Forgings

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item B.2.1 was revised as below:

2.1 Suitable grades of forging steel conforming to recognized standards, e.g. ~~EN 10083~~ ISO 683, EN 10250-2 and EN 10250-3.

Table 5.8 was revised as below:

Steel grade	Standard
42 Cr Mo 4	~~EN 10083~~ISO 683-1, 2
16 Mn Cr 5	~~EN~~ ISO 683-3
20 Mn Cr 5	
18 Cr Ni Mo 7-6	

Item D.2.1 was revised as below:

2.1 Quenched and tempered steels conforming to ~~EN 10083~~ISO 683-1, 2, case hardening steels conforming to ~~EN~~ ISO 683-3 and nitriding steels conforming to ~~EN 10085~~ ISO 683-5, provided that proof has been furnished of the suitability of the individual grade of steel for the intended purpose. Table 5.8 contains a selection of suitable steel grades.

03. Section 6 – Steel Castings

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Table 6.4 was revised as below:

Grade of steel	Minimum tensile strength (1) (2) R_m [N/mm²]	Yield strength R_{eH} [N/mm²] min.	Elongation A [%] min.	Reduction in area Z [%] min.	Impact energy (3)	
					KV [J] min.	KU [J] min.
Ordinary quality C-and CMn cast steel	400	200	25	40	25	25
	440	220	22	30	20	22
	480	240	20	27	18	20
	520	260	18	25	15	17
	560	~~280~~300	15	20	12	15
	600	3~~0~~20	13	20	10	12
Special quality C and CMn cast steel	400	200	28	45	32	30
	440	220	26	45	28	27
	480	240	24	40	25	25

	520	260	22	40	20	22
	560	280	20	35	18	20
	600	300	18	35	15	17

(1) *Where the minimum tensile strength of a steel grade falls between two of the graduated values, the requirements may be determined by interpolation.*

(2) *The tensile strength determined by testing may not exceed the specified minimum tensile strength by more than 150 N/mm^2 in case of the ordinary qualities and 120 N/mm^2 in the case of the special qualities.*

(3) *Average value of 3 tests (individual value not less than 70 %).*

04. Section 13 – Fibre Reinforced Plastics

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item B.1.2.4.2 was revised as below:

……

- Abrasion resistance
  (~~DIN 53754 –~~ ISO 9352) 3 samples

……

Items B.1.3.2.3, B.1.3.3.5, B.1.3.4.2, B.1.3.5.6 and B.1.4.2.3 were revised as below:

1.3.2.3 The filament and its treatment/sizing is to be submitted:

- Filament diameter (~~DIN 53811~~ ISO 1888 - ISO 137),

……

1.3.3.5 A difference is to be made between chemical and mechanical bond types. In the case of chemical bond types, the binder, the percentage weight (glass ISO 1887, carbon DIN 29965) and its solubility (~~DIN 52332~~ ISO 2558) is to be indicated. In the case of mechanical bond types, the type of weave is to be indicated.

1.3.4.2 For rovings, tensile test specimens are to be prepared for all fibre materials in accordance with DIN 29965, Section 4.1.3.5. The test certificate of a recognized testing body is to all be submitted to verify the tensile strength, the fracture strain and the modulus of elasticity as the mean values from six tests carried out in accordance with DIN 65382. Furthermore, the tensile strength and the modulus of elasticity is to ll be determined in accordance with ~~DIN 65469~~ ISO 527-1,4,5 on flat specimens prepared for testing under tension.

1.3.5.6 The stiffness of the gun rovings to be verified in accordance with~~DIN 52316~~ ISO 3375 is to not be below 130 mm.

1.4.2.3 The following are necessary for the reinforcing material:

- Filament diameter (~~DIN 53811~~ ISO 1888 - ISO 137),

……

PART A – CHAPTER 3 – WELDING

01. Section 2 - Requirement for Welding Shops, Approval

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item A.3 was revised as below:

3.2 For certification in accordance with 2.2, information and documents relating to the elements specified in ~~Annex 1 to~~ ISO 3834-1 for the respective grade of requirement (ISO 3834-2 = full, -3 = standard, or -4 = basic quality requirements) must also be enclosed with the application for approval (e.g. in the form of relevant procedure instructions):

- Contract review,
- Design review,
- Treatment of subcontractors ,
- Equipment maintenance,
- Quality inspections,
- Nonconformance,
- Calibration,
- Identification,
- Traceability.

If the welding shop operates a certified quality assurance system conforming to the series of standards ISO 9000, the QA manual and - if specified in ~~Annex 1 to~~ ISO 3834-1 - documentation relating to the quality assurance measures performed (quality reports) must be submitted to TL for inspection in place of the above information and documents.

Item B.3.2 was revised as below:

3.2 Welders for manual and semi-mechanized welding must have passed a test in accordance with Section 3 and in conformity with a recognized standard (e.g. EN ISO 9606-2, ~~EN 287/~~ISO 9606-1, ASME Section IX or TSE as applicable). The test shall cover the conditions likely to occur in the fabrication work with regard to the process(es), base material, welding consumable and welding position(s). The production of test pieces in a successfully completed welding procedure or production test may be taken as proof of manual skill for testing of welders.

02. Section 3 - Welder's Qualification Tests

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item A.3 was revised and A.4 was added acoording to UR W32 Rev.1 as below:

3. This qualification scheme does not cover welding of pipes and pressure vessels.

4. Alternative welding Standards or Codes are to be applied in full, cross-mixing requirements of Standards and Codes is not permitted.

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Note was added under item A.4 acoording to Rec. 105 Rev.1 as below:

Note: *For a qualification scheme for welders intended to be engaged in welding of aluminium alloys specified in TL Rules Chapter 2, Section 8 for hull structures may be used TL-G 105.*

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item B.2 was revised acoording to UR W32 Rev.1 as below:

……

The qualification test and approval range of the welding operator are left to the discretion of **TL** with reference to ISO 14732:2013.

Item B.5 was revised acoording to UR W32 Rev.1 as below:

5. Equivalence of national or international standards to this rule.

5.1 Welders or welding operators qualified in accordance with national or international welder qualification standards may also be engaged in welding of hull structures at the discretion of **TL** provided that ~~the qualification testing, range of approval and revalidation requirements are~~ standard is considered equivalent to this rule from technical perspective covering examination, testing and range approval.

5.2 Even if the requirements stipulated in the standards are applied, the requirement for revalidation of welders' qualification shall be in accordance with F, 2.1.

Item D.3.2 was revised acoording to UR W32 Rev.1 as below:

……

Imperfections detected are to be assessed in accordance with quality level B in ISO 5817:2014, except for the following imperfection types for which level C applies;

……

Items D.3.4, 3.5 and 3.6 were revised acoording to UR W32 Rev.1 as below:

3.4 Radiographic Test

When radiographic testing is used for butt welds, imperfections detected shall be assessed in accordance with ISO 5817:2014, level B.

3.5 Fracture Test (Butt Welds)

When fracture test is used for butt welds, full test specimen in length is to be tested in accordance with ISO 9017:2017. Imperfections detected shall be assessed in accordance with ISO 5817:2014, level B.

……

Evaluation shall concentrate on cracks, porosity and pores, inclusions, lack of fusion and incomplete penetration. Imperfections that are detected shall be assessed in accordance with ISO 5817:2014, level B.

Item E.1 was revised acoording to UR W32 Rev.1 as below:

1. Qualification certificates are normally issued when the welder has passed the qualification test ~~by~~ in accordance with **TL**'s Rules. Each Shipyard and Manufacturer shall be responsible for the control of the validity of the certificate and the range of the approval.

Paragraph under item F.1.1 was numbered as F.1.2 and item F.1.2 was renumbered and paragraph under existing item F.1.2 was numbered as F.1.4 and revised as below:

1.4 The validity of the certificate may be maintained in agreement with **TL** as specified in 2. The chosen maintenance ~~scheme~~ option of qualification in accordance with 2.1. a) or b) or c) shall be stated on the certificate at the time of issue.

Item F.2.1 was revised acoording to UR W32 Rev.1 as below:

2.1 Revalidation shall be carried out by **TL.** The skill of the welder shall be periodically verified by one of the following options:

a) The welder shall be re-tested every 3 years.

b) Every 2 years, two welds made during the last 6 months of the 2 years validity period shall be tested by radiographic or ultrasonic testing or destructive testing and shall be recorded. The weld tested shall reproduce the initial test conditions except for the thickness. These tests revalidate the welder's qualifications for an additional 2 years.

c) A welder's qualification for any certificate shall be valid as long as it is signed according to 1.2 subject that all the following conditions are fulfilled. In this option, the fulfilment of all the conditions is to be verified by **TL.** The frequency of verification by **TL** is to be no longer than 3 years and is to be agreed between **TL** and the shipyards/manufacturers.

I. The welder is working for the same shipyard/manufacturer which is responsible for production weld quality as indicated on his or her qualification certificate.

II. **TL** shall verify that the welder quality management system of the shipyard/manufacturer includes as minimum:

- A designated person responsible for the coordination of the welder quality management system.
- List of welders and welding supervisors in shipyard/manufacturer
- If applicable, list of subcontracted welders
- Qualification certificate of welders and description of the associated management system

- Training requirements for welder qualification programme
- Identification system for welders and WPS used on welds
- Procedure describing the system in place to monitor each welder performance based on results of welds examination records (e.g. repair rate, etc.) including the criteria permitting the maintenance of the welder qualification without retesting.

III. The shipyards/manufacturers have to document at least once a year that the welder has produced acceptable welds in accordance with construction quality standards and **TL**'s requirements in the welding positions, type of welds and backing conditions covered by its certificate. Which documents are required and how to document the evidences should be in agreement between **TL** and the shipyards/manufacturers.

03. Section 10 - Non-Destructive Testing of Welds

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item E.8 was revised acoording to UR W33 Corr.1 as below:

8. In general start/stop points in welds made using automatic or fully ~~(~~mechanized~~)~~ welding processes are to be examined using RT or UT, except for internal members where the extent of testing is to be agreed with the attending surveyor.

Item F.5.2 was revised acoording to UR W33 Corr.1 as below:

.....

Consideration may be given for reduction of inspection frequency for automated or fully mechanized welds where quality assurance techniques indicate consistent satisfactory quality. The number of checkpoints is to be increased if the proportion of non-conforming indications is abnormally high.

Item I.2 was revised acoording to UR W33 Corr.1 as below:

2. When unacceptable indications are found, additional areas of the same weld length shall be examined unless it is agreed with the surveyor and fabricator that the indication is isolated without any doubt. In case of automatic or fully mechanized welded joints, additional NDT shall be extended to all areas of the same weld length.

.....

04. Section 11 - Mechanical and Technological Tests

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item E was revised as below:

E. Notched Bar Impact Tests (~~EN 10045/DIN 50115~~ISO 148-1)

05. Section 12 - Welding of Hull Structures

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Note under item F.2.2.1 was revised as below:

Austenitic stainless steels and austenitic-ferritic stainless steels are therefore classified into different groups. In preference to the rough classification favoured by the standards of the series ISO15607 (the same applies in analogous manner to the welder's qualification tests conforming to ~~EN 287/~~ISO 9606-1), it is therefore advisable to use the classification given in CEN report 12187 or the anticipated follow-on standards. ***TL*** *may stipulate this.*

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item F.5.4 was revised according to Rec. 70 as below:

Different values shall be allowed for where applicable in the design and dimensioning operations. The stipulated tensile strength values apply to test specimens retaining the weld reinforcement. Other aluminium alloys shall be classified in analogous manner and the requirements for these are specified on a case-by-case basis allowing for the characteristics of the base material and the joint efficiency factors stipulated in EN ISO 15614-2.

For further details see TL-G 70 and EN ISO 15614-2.

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item G.15.1 was revised as below:

15.1 General

Any calculation relating to welded joints which is stipulated in the Rules or prescribed as an alternative to the rules governing dimensions shall be performed in accordance with the Chapter 1 - Hull, Section 20. Calculations conforming to other rules, standards or codes (e.g.~~DIN 15018~~ EN 13001-1, 2, EN 1993-1994 (DIN ~~18800~~1090-2) or DIN EN V 1993 (Eurocode 3)) are subject to the prior consent of **TL**.

06. Section 14 - Welding of Pressure Vessels

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item I.4.2.1.2 was revised as below:

.....

- Notched bar impact tests on ISO V-notch specimens in accordance with EN ISO 9016 (~~DIN 50115~~ISO 148-1), taking from each test piece one set of specimens with the notch in the centre of the weld metal (KM) and one set located at a point in the heat-affected zone (KÜ) at which the lowest impact energy values were measured in the welding procedure test.

.....

07. Section 15 - Welding of Pipelines

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item F.4.1 was revised as below:

4.1 Notched bar impact test on ISO V-notch specimens to EN ISO 9016 (~~DIN 50115~~ISO 148-1) taken from the centre of the weld metal (KM) (one set of specimens per welding position) as follows:

……

PART B – CHAPTER 4 MACHINERY

01. Section 1 – General Rules and Instructions

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item A.1.9 in Section 1 of Chapter 4 was revised as below:

A. General

1. Scope

……

1.9 All passenger ships shall comply with ~~**TL** additional rule "Qualitative Failure Analysis for Propulsion and Steering on Passenger Ships"~~ TL-R M69.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item D.1.8 was added and subsequent items were renumbered as below:

1.8 For ships subject to required EEDI requirement, the installed propulsion power shall not be less than the propulsion power needed to maintain the manoeuvrability of the ship under adverse conditions as defined in MEPC.1/Circ.850/Rev.3.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item D.12.2 was revised as below:

12.2 Remote controls

The remote control of the propulsion plant from the bridge is subject to the provisions of Chapter 4-1, Automation, Section 5, A~~.2~~.

02. Section 02 – Internal Combustion Engines and Air Compressors

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item F.1.1.3 in Section 2 of Chapter 4 was revised as below:

1.1.3 When electronic speed governors of main internal combustion engines form part of a remote control system, they are to comply with **TL** Rules, Chapter 4-1, Section 5, A~~.1 or 5, A.2~~ and namely with the following conditions:

……..

- local control of the engines is always to be possible, as required by Chapter 4-1, Section5, A~~.1~~, and, to this purpose, from the local control position it is to be possible to disconnect the remote signal, bearing in mind that the speed control according to subparagraph 1.1.1, is not availableunless an additional separate governor is provided for such local mode of control.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item F.4.1.1 in Section 2 of Chapter 4 was revised as below:

4. Crankcase Safety Devices

4.1 Relief valves

4.1.1 Crank safety case devices shall be type approved. See ~~**TL**"Type Testing Procedure for Crankcase Explosion Relief Valves"~~ TL-R M66.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Items F.4.3.1 & F.4.3.3 in Section 2 of Chapter 4 were revised as below:

4.3 Oil mist detection/monitoring and alarm system (Oil mist detector)

4.3.1 Engines with a cylinder diameter > 300 mm or a rated power of 2250 kW and above are to be fitted with crankcase oil mist detectors or engine bearing temperature monitors (all bearings i.e. journal and connecting rod bearings) or equivalent devices (See also TL- I SC228). The oil mist detectors are to be type tested in accordance with ~~Type Testing Procedure for Crankcase Oil Mist Detection and Alarm Equipment~~ TL-R M67.

……..

4.3.3 Oil mist detectors are to be type approved.

Oil mist detection arrangements are to be tested in accordance with ~~"Type Testing Procedure for Crankcase Oil Mist Detection and Alarm Equipment"~~ TL-R M67 and comply with 4.3.2 to 4.3.13.

03. Section 07 – Gears, Couplings

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Given reference in item G.2.2 in Section 7 of Chapter 4 was corrected as below:

2.2 Flexible couplings in the main propulsion plant and power-generating plants must be so dimensioned that they are able to withstand for a reasonable time operation with one engine cylinder out of service, see ~~Section 16, C.6.3~~ Section 6, C.4.2. Additional dynamic loads for ships with ice classes are to be taken into account. In this connection reference is made to Section 19.

04. Section 11 – Windlass and Winches

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item A.1.3 in Section 11 of Chapter 4 was revised as below:

1.3 Confirmed standards of compliance

The design, construction and testing of windlasses are to conform to an acceptable standard or code of practice. To be considered acceptable, the standard or code of practice is to specify criteria for stresses, performance and testing.

Essential standards presently recognized by **TL** are follows:

- ISO 7825 (2017): Deck machinery general requirements
- ISO 4568 (~~2006~~2021): ~~Shipbuilding~~Ships and marine technology - Sea-going vessels -Windlasses and anchor capstans
- ISO 3730 (2012): Shipbuilding and marine structures — Mooring winches
- SNAME T & R Bulletin 3-15 (2018): Guide to the Design and Testing of Anchor Windlasses for Merchant Ships
- JIS F6714 (1995): Windlasses
- JIS F6714 (1995): Windlasses

05. Section 15 – Oil Burners and Oil Firing Equipment

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Items A.3.2 and C.1.1 in Section 15 of Chapter 4 was revised according to revised standard as below:

3.2 For oil burners, which comply with the requirements according to ~~TS/~~EN 267 or to a recognized standard as equivalent by **TL** and have been certified by a third party, the scope of the drawing approval is to be agreed with **TL** in each individual case.

……..

C. Oil Burners for Hot Water Heaters, Oil-Fired Heaters and Small Heating Appliances

1. Atomizer Burners

1.1 Fully and semi-automatic atomizer burners must meet the requirements of ~~TS/~~EN 267 or must be recognized as equivalent.

06. Section 16 – Pipe Lines, Valves, Fittings and Pumps

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item G.12.2 in Section 16 of Chapter 4 was revised according to MEPC.1/Circ.864/Rev.1 as below:

12. Sampling points

12.1 The fuel oil pipelines should be provided with sampling points.

12.2 The sampling points should meet the requirements of MEPC.1/Circ.864/Rev.1 'Guidelines for on board sampling and verification of the sulphur content of the fuel oil used on board ships' and should be located as follows:

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item T.2.3 in Section 16 of Chapter 4 was revised as below:

2.3 For discharge lines above freeboard deck/bulkhead deck the following pipes may be used:

- Steel pipes according to Table 16.7~~5~~, Group N,

PART B – CHAPTER 4-1 AUTOMATION

01. Section 1 – General Rules and Instructions

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item E.4 in Section 1 of Chapter 4-1 was added as below:

4. R Notation

Applies to ships provided with a system for remote control of the main propulsion plant from the bridge.

Equipment must comply with the conditions laid down in Section 5, A.

02. Section 05 – Main Propulsion Plant

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item A in Section 5 of Chapter 4-1 was revised as below:

A. ~~REMOTE CONTROLS~~ MACHINERY CONTROLS

1. General
2. ~~Facilities on the Bridge~~ Remote Control of Machinery
3. ~~Facilities in the Machinery Control Room~~ Bridge Control of Machinery
4. ~~Facilities at the Engine Maneuvering Platform~~ Bridge Control of Propulsion Machinery
5. Supervision from a control room

A. Machinery Controls

1. General

1.1 Main and auxiliary machinery essential for the propulsion, control and safety of the ship shall be provided with effective means for its operation and control. All control systems essential for the propulsion, control and safety of the ship shall be independent or designed such that failure of one system does not degrade the performance of another system. (SOLAS Ch. II-1/31.1 and 31.5.1). ~~The remote control shall be capable to control, speed, direction of thrust and, as appropriate, torque or propeller pitch without restriction under all navigating and operating conditions.~~

1.2 It shall be possible for all machinery, essential for the safe operation of the ship, to be controlled from a local position, even in the case of failure in any part of the automatic or remote control systems. (SOLAS Ch. II-1/49.4). ~~Single lever control is to be preferred for remote control systems. Lever movement shall be in accordance to the desired course of the ship.~~

~~Commands entered into the remote control system from the bridge must be recognisable at all control stations.~~

1.3 **R** notation may be as**s**igned when requirements given in items 2.3, 2.5, 3.1, 3.2, 4.1 ÷ 4.**9** are **complied with.**

~~**1.3** The remote control system shall carry out commands which are ordered, including emergency maneuvers, in accordance with the propulsion plant manufacturer's specifications. Where critical speed ranges are incorporated, their quick passing is to be guaranteed and a reference input within them have to be inhibited.~~

~~**1.4** With each new command, stored commands must be erased and replaced by the new input.~~

~~**1.5** In the case of set speed stages, a facility must be provided to change the speed in the individual stages.~~

1.6 An overload limitation facility is to be provided for the propulsion machinery.

1.7 On ships with shaft-driven generators, it shall be ensured in case of maneuvers which would prevent operation of the shaft-driven generator system, that the supply of the equipment in accordance with Section 4, H.2 is maintained without interruption.

1.8 Following emergency manual shutdown or automatic shutdown of the main propulsion plant, a restart shall only be possible via the stop position of the command entry.

1.9 When the turning gear is engaged or automatic shutdown has not been acknowledged, any start attempts are to be prevented.

1.10 The failure of the remote control system and of the control power shall not result in any sudden change in the propulsion power nor in the speed and direction of rotation of the propeller. In individual cases, TL may approve other failure conditions, whereby is assumed that: - There is no increase in ship's speed, - There is no course change, - No unintentional start- up processes are initiated.

1.11 The failure of the remote control system and of the control power is to be signalled by an alarm**.**

1.12 Remote control systems for main propulsion plants are subject to mandatory type testing.

1.13 It shall be ensured that control is only possible from one control station at any time. Transfer of command from one control station to another shall only be possible when the respective control levers are in the same position and when a signal to accept the transfer is given from the selected control station. A display at each control station shall indicate which control station is in operation.

1.14 The take of control independent of the accept signal, stated in 1.13, shall only be possible in the machinery space. The less of control at the concerned control station is to be signaled audibly and visually**.**

2. Facilities on the Bridg

2.1 Change-over of control within the bridge area is not required where the control levers at the control stations are mechanically or electrically connected together and with the control unit of the remote control system so that they automatically adopt the same position.

2.2 An engine telegraph with feedback facility is to be fitted. The engine telegraph may be mechanically linked to the operation of the remote control system. Remote control and telegraph shall, however, according to the system, be mutually independent and shall have separate supplies.

2.3 The main propulsion system must be capable of being shutdown with an emergency manual shutdown facility from the bridge. This device shall be independent of the remote control system and it's power supply.

2.4 The emergency shutdown facility shall not be automatically cancelled and shall be protected against unintentional operation.

2.5 Where the safety system of the main propulsion plant shall be equipped with an overriding arrangement, this has to be installed on the bridge.

~~**2.6** With the consent of TL, for systems with clutch couplings, the shafting may be disconnected from the bridge as an emergency stop facility. The state of the coupling shall be indicated.~~

~~**2.7** An indicator for the propeller shaft speed and the direction of rotation shall be provided for propulsion systems with fixed propellers.~~

~~**2.8** In the case controllable pitch propeller systems, an indicator shall be provided to display the speed of the propeller shaft and the pitch of the propeller.~~

~~**2.9** In the case of systems which have reversing gears, indicators shall be provided to display the speed and direction of rotation of the propeller shaft and also the speed of the propulsion machinery.~~

~~**2.10** Override opportunity is permitted for shutdown criteria, as required in Section 8, except for shutdown in case of overspeed.~~

~~**2.11** Override opportunity shall be realized for shutdown criteria, as required in Section 8. It shall be also realized for additional shutdown and slowdown criteria, not listed in Section 8.~~

~~**3. Facilities in the Machinery Control Room**~~

~~If remote control of the propulsion plant is provided from a machinery control room, the equipment listed under 2.7 to 2.9 shall also be fitted in the machinery control room.~~

~~**4. Facilities at the Engine Maneuvering Platform**~~

~~A manual operating facility for the engine which is independent of the remote control system is to be installed at the local machinery control station.~~

~~The indicators listed in 2.7 to 2.9 shall be fitted at the control station.~~

2. Remote Control of Machinery

2.1 The engine room or the engine control room, if provided, is normally the main command location but another permanently attended location may be accepted as a more suitable main command location. It shall be possible at any time to take control of main functions locally at the machinery.

2.2 In general, automatic starting, operational and control systems shall include provisions for manually overriding the automatic controls. Failure of any part of such systems shall not prevent the use of the manual override. (SOLAS Ch. II-1/31.4)

2.3 Indicators shall be fitted on the navigation bridge, the main machinery control room and at the manoeuvring platform, for:

— propeller speed and direction of rotation in the case of fixed pitch propellers, and

— propeller speed and pitch position in the case of controllable pitch propellers.

(SOLAS Ch. II-1/31.2.8 and 31.5.6)

For systems with reversing gears the speed of the propulsion machinery is also to be indicated at navigation bridge.

2.4 Remote starting of the propulsion machinery shall be automatically inhibited if conditions exist which may hazard the machinery, e.g. turning gear engaged.

2.5 The design of the remote control system shall be such that in case of its failure an alarm will be given.

Unless the administration considers it impracticable the pre-set speed and direction of thrust of the propeller shall be maintained until local control is in operation. (SOLAS Ch. II-1/31.2.7)

3. Bridge Control of Machinery

3.1 Overload shall be indicated on the bridge if automatic load limitation is not arranged for.

3.2 An alarm shall be initiated on the bridge and in the engine room at starting failure.

4. Bridge Control of Propulsion Machinery

4.1 The speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigating bridge under all sailing conditions, including manoeuvring. (SOLAS Ch. II-1/31.2.1)

4.2 The control shall be performed by a single control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery Where multiple propellers are designed to operate simultaneously, they may be controlled by one control device. (see SOLAS Ch. II-1/31.2.2 and 31.5.3)

4.3 The main propulsion machinery shall be provided with an emergency stopping device on the navigating bridge which shall be independent of the navigating bridge control system. (SOLAS Ch. II-1/31.2.3)

The emergency stopping device shall not be automatically cancelled and shall be protected against unintentional operation.

Note: With the consent of TL, for systems with clutch couplings, the shafting may be disconnected from the bridge as an emergency stop facility. The state of the coupling shall be indicated.

4.4 Propulsion machinery orders from the navigation bridge shall be indicated in the main machinery control room and at the manoeuvring platform. (SOLAS Ch. II-1/31.2.4)

4.5 Remote control of the propulsion machinery shall be possible only from one location at a time, at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigating bridge and machinery spaces shall be possible only in the main machinery space or the main machinery control room. This system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another. (SOLAS Ch. II-1/31.2.5).

Note: Change-over of control within the bridge area is not required where the control levers at the control stations are mechanically or electrically connected together and with the control unit of the remote control system so that they automatically adopt the same position.

4.6 It shall be possible to control the propulsion machinery locally, even in the case of failure in any part of the remote control system. It shall also be possible to control the auxiliary machinery, essential for the propulsion and safety of the ship, at or near the machinery concerned. (SOLAS Ch. II-1/31.2.6)

4.7 An alarm shall be provided on the navigating bridge and in the machinery space to indicate low starting air pressure which shall be set at a level to permit further main engine starting operations. If the remote control system of the propulsion machinery is designed for automatic starting, the number of automatic consecutive attempts which fail to produce a start shall be limited in order to safeguard sufficient starting air pressure for starting locally. (SOLAS Ch. II-1/31.2.9)

4.8 Automation systems shall be designed in a manner which ensures that threshold warning of impending or imminent slowdown or shutdown of the propulsion system is given to the officer in charge of **the** navigational watch in time to assess navigational circumstances in an emergency. In particular, the systems shall control, monitor, report, alert and take safety action to slow down or stop propulsion while providing the officer in charge of the navigational watch an opportunity to manually intervene, except for those cases where manual intervention will result in total failure of the engine and/or propulsion equipment within a short time, for example in the case of overspeed. (SOLAS Ch. II-1/31.2.10).

4.9 At least two independent means shall be provided for communicating orders from the navigation bridge to the position in the machinery space or in the control room from which the speed and direction of thrust of the propellers are normally controlled; one of these shall be an engine-room telegraph which provides visual indication of the orders and responses both in the machinery spaces and on the navigation bridge. Appropriate means of communication shall be provided from the navigation bridge and the engine-room to any other position from which the speed or direction of thrust of the propellers may be controlled. (SOLAS Ch. II-1/37).

An engine telegraph with feedback facility is to be fitted. The engine telegraph may be mechanically linked to the operation of the remote control system. Remote control and telegraph shall, however, according to the system, be mutually independent and shall have separate supplies.

5. Supervision from a Control Room

5.1 Where the main propulsion and associated machinery, including sources of main electrical supply, are provided with various degrees of automatic or remote control and are under continuous manual supervision from a control room the arrangements and controls shall be so designed, equipped and installed that the machinery operation will be as safe and effective as if it were under direct supervision, for this purpose SOLAS Ch. II-1 Regulations 46 to 50 shall apply as appropriate. Particular consideration shall be given to protect such spaces against fire and flooding. (SOLAS Ch. II-1/31.3).

PART B – CHAPTER 5 ELECTRICAL INSTALLATION

01. Section 1 – General Requirements and Instructions

Revision Date: September 2021

Entry into Force Date: 1 January 2022

IEC standard reference was revised in item K.9 in Section 1 of Chapter 5 according to UR E12 Rev.2 as below:

3.9 Explosion protection on tankers

Regarding hazardous areas and approved electrical equipment on tankers see:

- IEC 60092-502:1999

02. Section 8 – High-Voltage Installations

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item D.3.5 in Section 8 was revised as below:

3.5 Power contactors

Power contactors shall conform to IEC publication 62271-106.

High voltage power contactor fuse combinations shall be dimensioned according to IEC publication 62271-106 subclause 5.107.3.4 ~~4.107.3~~ damage classification "type c".

Is the safety of the staff and the selective protection of the ships grid ensured by connected upstream devices high voltage contactors supplying secondary or unessential consumers may be dimensioned according to "damage classification type a" of IEC publication 62271-106.

03. Section 12 – Cable Network

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item C.1.2 in Section 12 of Chapter 5 was revised as below:

1.2 The following loads are to be assumed for 250 V AC ~~lighting circuits and~~ socket-outlet circuits:

~~**1.2.1** For each lighting point, at least 100 W,~~

1.2.1~~1~~2 For each socket-outlet, at least 200 W.

Revision Date: September 2021

Entry into Force Date: 1 January 2022

IEC standard references were revised in item D.15.1 in Section 12 according to UR E15 Rev.4 as below:

15. Application of Fire-Resistant Cables

15.1 Scope of installations

.....

15.1.1.1 Cables being of a fire resistant type complying with IEC 60331-1:2018 for cables of greater than 20 mm overall diameter, otherwise IEC 60331-21:1999+AMD1:2009 or IEC 60331-2:2018 for cables with an overall

diameter not exceeding 20 mm, are installed and run continuous to keep the fire integrity within the high fire risk area, see Fig.12.5.

……..

Notes:

a) *The definition for "high fire risk areas" is the following:*

- Machinery spaces as defined by ~~in Chapter II-2/~~ Regulation 3.30 of SOLAS Chapter II-2, as amended by IMO resolutions up to MSC.421(98) (hereinafter the same), except spaces having little or no fire risk as defined by paragraphs (10) of ~~Chapter II-2/~~ Regulation 9.2.2.3.2.2 of SOLAS Chapter II-2. (Including the interpretations for tables 9.3, 9.4, 9.5, 9.6, 9.7 and 9.8 given in MSC/Circ.1120 as amended by MSC.1/Circ.1436 and MSC.1/Circ.1510)

……..

*- Spaces as defined in paragraphs (8), (12) and (14) of ~~Chapter II-2/~~ Regulation 9.2.2.3.2.2 of **SOLAS** Chapter II-2 for ships carrying more than 36 passengers.*

……..

c) *For special cables, requirement in the following standards may be used:*

IEC 60331-23:1999: Procedures and requirements-Electric data cables

IEC 60331-25:1999: Procedures and requirements-Optical fibre cables

04. Section 15 – Additional Rules for Tankers

Revision Date: September 2021

Entry into Force Date: 1 January 2022

IEC standard references were revised in items A.2.6, A.3.1, A.5.1, C.1.1, C.2.1, C.3.1 in Section 15 according to UR E12 Rev.2 as below:

A. General

……..

2. References to Other TL Rules and Guidelines

……..

2.6 IEC publication 60092-502:1999.

2.7 SOLAS

3. Hazardous Areas

3.1 Hazardous areas in which protective measures are mandatorily required are specified in B. and C. and in IEC 60092-502:1999 and Chapter 10 - Liquefied Gas Tankers and IGC-Code and Chapter 8 - Chemical Tankers and IBC-Code.

……..

5. Cable Installation

……..

Note:

Where the prescriptive requirements within SOLAS and related Codes (IBC, IGC) and the standards published by the International Electrotechnical Commission, such as but not limited to IEC 60092-502:1999, are not aligned, the prescriptive requirements in SOLAS and Codes take precedence and are to be applied. The differences revealed between the above mentioned documents are listed in TL- I SC274 Annex 1.

……..

C. Oil Tankers, Cargo Flash Point 60°C or below

1. Hazardous Areas Zone 0 and Permitted Electrical Equipment

1.1 Hazardous areas (zone 0) are specified in IEC 60092-502:1999, item 4.2.1

1.2 Electrical equipment, necessary to install in zone 0- spaces shall be of types mentioned in Section 1, K.3.2.2

2. Hazardous Areas Zone 1 and Permitted Electrical Equipment

2.1 Hazardous areas (zone 1) are specified in IEC 60092-502:1999 item 4.2.2

2.2 Electrical equipment, necessary to install in zone 1-spaces shall be of types mentioned in Section 1, K.3.3.2

3. Extended Hazardous Areas Zone 2 and Permitted Electrical Equipment

3.1 Extended hazardous areas (zone 2) are specified in IEC 60092-502:1999 item 4.2.3

05. Section 20 – Electrical Equipment

Revision Date: September 2021

Entry into Force Date: 1 January 2022

IEC standard references were revised in item A.4 in Section 20 according to UR E13 Rev.3 as below:

4. Testing of Electrical Machinery

All electric machines shall be tested at the manufacturer's works.

A works test report shall be prepared covering the tests performed.

The tests shall be performed in accordance with IEC 60092-301:1980/AMD2:1995 and 60034-1:2017.

……..

4.3.6 Temperature rise test

The temperature rises are to be measured at the rated output, voltage, frequency and the duty for which the machine is rated and marked in accordance with the testing methods specified in IEC 60034-1:2017, or by means of a combination of other tests.

The limits of temperature rise are those specified in Table 1 of IEC 60034-1:2017 adjusted as necessary for the ambient reference temperatures specified in TL- R M40.

.....

4.3.8 Overload, overcurrent test

Overload test is to be carried out as a type test for generators as a proof of overload capability of generators and excitation system, for motors as a proof of momentary excess torque as required in IEC 60034-1:2017. The overload test can be replaced at routine test by the overcurrent test. The over current test shall be the proof of current capability of windings, wires, connections etc. of each machine. The overcurrent test can be done at reduced speed (motors) or at short circuit (generators).

.....

4.3.10 Overspeed test

Machines are to withstand the overspeed test as specified in to IEC 60034-1:2017. As proof of mechanical strength, a two-minute over-speed test shall be carried out as follows:

.....

4.3.11 Dielectric strength test (high-voltage test)

Machines are to withstand a dielectric test as specified in IEC 60034-1:2017. For high voltage machine an impulse test is to be carried out on the coils according to TL- R E11.

.....

4.3.13 Test of degree of protection

As specified in IEC 60034-5:2000+AMD1:2006 and Table 1.10

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item F.2.1 in Section 20 was revised as below:

2.1 ~~Electrolytic copper with a resistivity not exceeding 17.241 ohm mm2 /km at 20°C shall be used as the material for the conductors of cables and wires.~~ The conductor materials of cables and wires shall comply with IEC 60228.

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item B.4.1, Table 20.7 in Section 20 was revised as below:

4.1 Heat test

The test shall be performed to determine the temperature rise, which shall not exceed the maximum permissible values shown in Table 20.6.

Temperature test at full load may be difficult to realise on large transformers, due to insufficient test power being available. One of these simulated tests, or equivalent may be accepted:

- Back to back method, according to IEC 60076-11 ~~23.2.2~~
- Simulated load method, according to IEC 60076-11 ~~23.2.1~~.

.....

Table 20.7 Scope of testing and inspection of transformers

No.	Explanations	Routine Tests	Type Tests	IEC reference
1	Inspection of enclosure, terminations, instrumentation or protection	x		
2	Measuring of insulation resistance	x		
3	Measuring of voltage ratio ~~at no load~~ and check of phase displacement	x		IEC 60076-11.14.2~~16~~
4	Measuring of winding resistance	x		IEC 60076-11.14.2~~15~~
5	Short circuit impedance and load losses	x		IEC 60076-11.14.2~~17~~
6	Measuring of no-load loss and current	x		IEC 60076-11.14.2~~18~~
7	~~Separate-source AC withstand voltage test~~ Applied voltage test (AV)	x		IEC 60076-11.14.2~~19~~
8	~~Inducted AC withstand voltage test~~ Induced voltage withstand test (IVW)	x		IEC 60076-11.14.2~~20~~
9	Temperature rise test		x	IEC 60076-11.14.3~~23~~
10	Partial discharge measurement on transformer windings with Um ≥ 3.6 kV. Maximum level of partial discharge shall be 10 pC. (Not applicable to liquid immersed transformers.)	x		IEC 60076-11.14.2~~22~~

PART C – CHAPTER 7 – HIGH SPEED CRAFT

01. Section 3 – Structures

Revision Date: November 2021

Entry into Force Date: 1 January 2022

K3.4 Overall Loads

K3.4.1 Monohulls

K3.4.1.1 General

.1 *In general, the wave induced bending loads and shear forces according to K3.4.1.2 are accepted.*

.2 *For monohulls of unusual form and design and for ships with extreme bow flare, **TL** may require determination of vertical wave-induced bending moments and share forces as well as their distribution over the ship's length considering various mass distributions. Accepted calculation procedures are to be applied.*

.3 *Where deemed necessary, stresses due torsion and/or horizontal wave bending, etc. are to be considered in a global stress analysis.*

Note:

~~*Upon request, such calculations will be performed by **TL**.*~~ *TL may request additional documents and calculations according to the specific nature of the ship to be classed..*

02. Annex 9 – Open Reversible Liferafts

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Footnote of item 1.1.6 was revised acoording to MSC 481(102) as below:

* *Refer to the Revised Recommendation on the Use and Fitting of Retro -Reflective Materials on Life -Saving Appliances, adopted by the Organization by resolution ~~A.658(16)~~ MSC 481(102).*

PART C – CHAPTER 28 – VENTILATION

01. Section 1 – Ventilation

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item D.2.1.4 was revised and items D.2.1.5 and 2.1.6 were deleted and subsequent items were renumbered as below:

2.1.4 The thickness of the coaming plates is to be ~~7.5 mm where the clear opening sectional area of the ventilator coamings is 300 cm^2 or less, and 10 mm where the clear opening sectional area exceeds 1600 cm^2. Intermediate values are to be determined by direct interpolation. A thickness of 6 mm will generally be sufficient within not permanently closed superstructures~~. according to Chapter 1, Hull Rules, Section 16, E.3

~~**2.1.5** The thickness of ventilator posts shall be at least equal to the thickness of coaming as per 2.1.4.~~

~~**2.1.6** The wall thickness of ventilator posts of a clear sectional area exceeding 1600 cm^2 is to be increased according to the expected loads.~~

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Existing item D.2.1.10 in Section 1 of Chapter 28 was revised as below:

2.1.10 Where the thickness of the deck plating is less than 10 mm, ~~a doubling plate or~~ an insert plate of 10 mm thickness is to be fitted. Their side lengths are to be equal to twice the length or breadth of the coaming.

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Item E.11.5 in Section 1 of Chapter 28 was revised according to UI M75 Recv.1 as below:

11.5 The following requirements apply to closable ventilation louvers and ventilator closing appliances serving emergency generator rooms, where fitted. ~~The following requirements apply to ventilation louvers for emergency generator rooms and to closing appliances where fitted to ventalators serving emergency generator rooms:~~

.....

11.5.3 Power-operated ventilation louvers and closing appliances shall be of a fail-to-open type. Closed power-operated ventilation louvers and closing appliances are acceptable during normal operation of the vessel. Power-operated ventilation louvers and closing appliances shall open automatically whenever the emergency generator is starting / in operation.

PART C – CHAPTER 37 TENTATIVE RULES FOR THE CLASSIFICATION OF PASSENGER CRAFT

01. Section 7 – Craft Operation Installations and Auxiliary Systems

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item C.9 in Section 7 of Chapter 37 was revised according to MEPC.1/Circ.864/Rev.1 as below:

9. Sampling points

The fuel oil pipelines should be provided with sampling points.
The sampling points should meet the requirements of MEPC.1/Circ.864/Rev.1 “Guidelines for on board sampling and verification of the sulphur content of the fuel oil used on board ships’ and should be located as follows:

PART D – CHAPTER 53 – SUBMERSIBLES

01. Section 1 – Classification and Certification of Manned Submersibles

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item B.2.1 was revised as below:

.....

– For machinery installations

M-S

PART D – CHAPTER 70 – MULTI-POINT MOORING SYSTEMS

01. Section 4 – Design Loads and Analysis

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Items B.1.1 b) and B.2.1 b) were revised as below:

b) The empirical method described in the document "*OCIMF Mooring Equipment Guidelines (MEG4)*".

……

b) The empirical method described in the document "*OCIMF Mooring Equipment Guidelines (MEG4)*".

PART E – CHAPTER 101 – NAVAL SHIP TECHNOLOGY, CLASSIFICATION AND SURVEYS

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

PART E – CHAPTER 102 – NAVAL SHIP TECHNOLOGY, HULL STRUCTURES AND SHIP EQUIPMENT

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

PART E – CHAPTER 103 – NAVAL SHIP TECHNOLOGY, METALLIC MATERIALS

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

PART E – CHAPTER 104 – NAVAL SHIP TECHNOLOGY, PROPULSION PLANTS

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

PART E – CHAPTER 105 – NAVAL SHIP TECHNOLOGY, ELECTRICAL INSTALLATIONS

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

PART E – CHAPTER 106 – NAVAL SHIP TECHNOLOGY, AUTOMATION

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

PART E – CHAPTER 107 – NAVAL SHIP TECHNOLOGY, SHIP OPERATION INSTALLATIONS AND AUXILIARY SYSTEMS

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Rule was generally revised.

ADDITIONAL RULE – RULE FOR PERMISSIBLE REDUCTION OF THICKNESS

01. General

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Additional Rule was generally revised.

ADDITIONAL RULE – SHIPBUILDING and REPAIR QUALITY STANDARD

01. Section 1 – Shipbuilding and Remedial Quality Standard for New Construction

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item A.3 was revised acoording to Rec.47 Rev.10 as below:

.....

In assessing the criticality of hull structure and structural components, reference is made to ref. A1, A2, A3, A11, A13, A14, A15 ~~and~~, A16, A19 and A21.

Item C.1.1 was revised according to Rec.47 Rev.10 as below:

1.1 Welders are to be qualified in accordance with ~~the procedures of **TL**~~ TL-R W32 (ref.A18) or ~~to a~~ other recognized ~~national or international~~ standard accepted by **TL**. Recognition of other standards is subject to submission to **TL** for evaluation. Subcontractors are to keep records of welders qualification and, when required, furnish valid approval test certificates.

Item C.3 was revised according to Rec.47 Rev.10 as below:

In case, of non-destructive examination carried out by an independent firm from the shipbuilder, such firm has to comply with TL-R W35 (Ref.A20).

Item D.1 was revised according to Rec.47 Rev.10 as below:

1. Materials for Structural Members

All materials, including weld consumables, to be used for the structural members are to be approved by **TL** as per the approved construction drawings and meet the respective TL Requirements (see ref. A4, A5, A6, A7, A8 ~~and~~, A9 and A17) Additional recommendations are contained in the following paragraphs.

……

Name of Figure 1.1 was revised according to Rec.47 Rev.10 as below:

……

(~~Ref. Nr.~~ EN 10163-1:2004~~+AC:2007 E~~)

Name of Figure 1.2 was revised according to Rec.47 Rev.10 as below:

……

(~~Ref. Nr.~~ EN 10163-1:2004~~+AC:2007 E~~)

References were revised according to Rec.47 Rev.10 as below:

……

A17. TL-R W31 "YP 47 Steels and Brittle Crack Arrest Steels"
A18. TL-R W32 "Qualification scheme for welders of hull structural steels"
A19. TL-R W34 "Advanced non-destructive testing of materials and welds"
A20. TL-R W35 "Requirements for NDT Suppliers"
A21. TL-R S33 "Requirements for Use of Extremely Thick Steel Plates in Container Ships"

STANDARDS

EN 10163-1:2004 Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections − Part 1: General requirements

02. Section 2 – Repair Quality Standard for Existing Ships

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item A.4 was added according to Rec.47 Rev.10 as below:

4. TL-R W33 (Ref.B8) scope is for new construction only, however, for the purpose of NDT applicability within this Section, TL-R W33 may be used as reference for NDT methods and acceptance standards.

Item C.1.1 was revised according to Rec.47 Rev.10 as below:

1.1 Welders are to be qualified in accordance with ~~the procedures of **TL**~~ TL-R W32 (ref.B13) or to a recognised national or international standard, e.g. ~~EN 287,~~ ISO 9606-1:2012/COR2:2013, ASME BPVC, Section IX:2019, ANSI/AWS D1.1:2020. Recognition of other standards is subject to submission to **TL** for evaluation. Repair yards and workshops are to keep records of welders qualification and, when required, furnish valid approval test certificates.

Item C.2 was revised according to Rec.47 Rev.10 as below:

2. Qualification of Welding Procedures

Welding procedures are to be qualified in accordance with ~~the procedures of **TL**~~ TL-R W28 (ref.B12) or a recognised national or international standard, e.g. EN~~288~~ ISO 15607:2019, ISO ~~9956~~15614-1:2017, ASME BPVC, Section IX:2019, ANSI/AWS D1.1:2020. Recognition of other standards is subject to submission to **TL** for evaluation. The welding procedure should be supported by a welding procedure qualification record. The specification is to include the welding process, types of electrodes, weld shape, edge preparation, welding techniques and positions.

Table 2.2 was revised according to Rec.47 Rev.10 as below:

Steel grades according to TL rules (ref. B4)							Comparable steel grades (1)			
Grade	Yield stress R_{eH} min. N/mm^2	Tensile strength R_m N/mm^2	Elongation A_5 min. %	Average impact energy for t ≤ 50 mm Test temp. °C	J, min. L	T	EN 10025:1990 (2) ISO 4950-2:1995	EN 10025 Series:2004	ASTMA 131 GB712-2011	JIS G 3106
A B D E	235	400 - 520	22	+20 0 -20 -40	- 27 27 27	- 20 20 20	Fe 360B Fe 360C Fe 360D -	S235JR S235J0 S235J2 S275NL,S275ML	A B D E	SM400B SM400B,SM400C -
A 27 D 27 E 27	265	400 - 530	22	0 -20 -40	27	20	Fe 430C Fe 430D -	S275J0 S275J2,S275N/S275M S275NL,S275ML	- - -	- - -
A 32 D 32 E 32	315	440 - 570	22	0 -20 -40	31	22	- - -	- - -	AH32 DH32 EH32	SM490B,SM490C - -
A 36 D 36 E 36	355	490 - 630	21	0 -20 -40	34	24	Fe 510C Fe510D E355DD	S355J0 S355J2,S355N,S355M S355NL,S355ML	AH36 DH36 EH36	SM520B,SM520C - -
A 40 D 40 E 40	390	510 - 660	20	0 -20 -40	39	26	E390CC E390DD E390E	S420N S420M S420N/S420M S420NL,S420ML	AH40 DH40 EH40	SM570 - -

Note :

(1) *In selecting comparable steels from this table, attention should be given to the requirements of Table 2.1 and the dimension requirements of the product with respect to **TL** rules. Some steel grades as per national or international standard are defined with specified yield and tensile strength properties which depend on thickness. For thicknesses with tensile properties specified lower than those of **TL** Rules, case-by-case consideration shall be given with regards to design requirements.*

(2) *EN 10025:1990 is superseded by EN10025 series: 2019 (e.g. EN 10025-2:2019, EN 10025-3:2019, EN 10025-4:2019).*

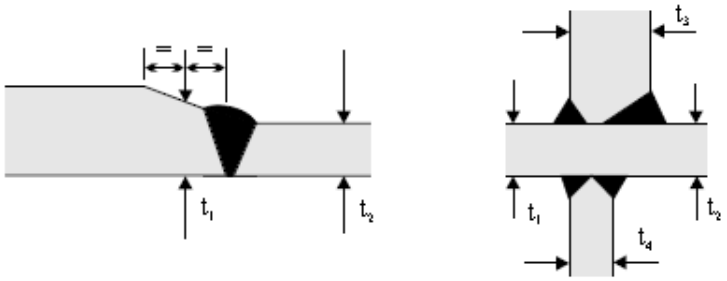
Table 2.3 was revised according to Rec.47 Rev.10 as below:

Carbon equivalent (1)	**Recommended minimum preheat temperature (°C)**		
	t_{comb} ≤ 50 mm (2)	**50 mm < t_{comb} ≤ 70 mm (2)**	**t_{comb} > 70 mm (2)**
Ceq ≤ 0.39	- -	-	50
Ceq ≤ 0.41	- -	-	75
Ceq ≤ 0.43	-	50	100
Ceq ≤ 0.45	50	100	125
Ceq ≤ 0.47	100	125	150
Ceq ≤ 0.50	125	150	175

Notes :

(1) $$Ceq = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}(\%)$$

(2) *Combined thickness $t_{comb} = t_1+t_2+t_3+t_4$, see figure*



References were revised according to Rec.47 Rev.10 as below:

B12. TL-R W28 "Welding procedure qualification tests of steels for hull construction and marine structures"

B13. TL-R W32 "Qualification scheme for welders of hull structural steels"

STANDARDS

ANSI/AWS D1.1:2020 Structural Welding Code − Steel

ASME BPVC, Section IX:2019 Boiler and Pressure Vessel Code, Section IX: Welding and Brazing Qualifications

ASTM A 131:2019 Standard Specification for Structural Steel for Ships

EN 10025-2:2019 Hot Rolled Products of Structural Steels - Part 2: Technical Delivery Conditions For Non-alloy Structural Steels

EN 10025-3:2019 Hot Rolled Products of Structural Steels - Part 3: Technical Delivery Conditions For Normalized/normalized Rolled Weldable Fine Grain Structural Steels

EN 10025-4:2019 Hot Rolled Products of Structural Steels - Part 4: Technical Delivery Conditions for Thermomechanical Rolled Weldable Fine Grain Structural Steels

EN ISO 15607:2019 Specification and Qualification of Welding Procedures For Metallic Materials - General Rules

GB 712:2011 Ship and ocean engineering structural steel

ISO 4950-2:1995/Amd 1:2003 High yield strength flat steel products − Part 2: Products supplied in the normalized or controlled rolled condition − Amendment 1

ISO 9606 -1:2012/COR2:2013 Qualification testing of welders − Fusion welding − Part 1: Steels − Technical Corrigendum 2
ISO 15614-1:2017 Specification and qualification of welding procedures for metallic materials − Welding procedure test − Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys
JIS G 3106:2015 /Amd 1:2017 Rolled steels for welded structure (Amendment 1)

ADDITIONAL RULE – SURVEY and CERTIFICATION RULES ON ENERGY EFFICIENCY OF SHIPS (MARPOL 73/78 ANNEX VI, CHAPTER 4)

01. General

Revision Date: October 2021

Entry into Force Date: 1 January 2022

Content was revised according to MEPC.1/Circ.795/Rev.5 as below:

……

Annex 2: B- Applicability of Phases specified in table 1 of regulation 21 (required EEDI) of MARPOL Annex VI to new ships according to MEPC.1/Circ 795/Rev.5

……

Item 1 was revised acoording to MEPC.1/Circ.795/Rev.5 as below:

……

(**TL note:** For the application of phases specified in regulation 21 (required EEDI) to “new ship”, refer to Annex 2 B of these guidelines or MEPC.1/Circ 795/Rev.5)

……

(**Additional information:** Unified Interpretations for major conversion (MEPC.1/Circ 795/Rev.5)):

Item 2.1 was revised acoording to MEPC 324(75) and 332(76) as below:

……

That falls into one or more of the categories defined in Regulation 2.25 to 2.35, 2.38 and 2.39 of MARPOL 73/78 ANNEX VI, attained EEDI shall be calculated in accordance with IMO Resolution MEPC 308(73) as amended by MEPC 322(74) and MEPC 332(76) "2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS".

For the definition of each type of ship, please refer to Annex 1.

For each ship subject to regulation 21 of MARPOL Annex VI, the Administration or any organization duly authorized by it shall report to the Organization the required and attained EEDI values and relevant information via electronic communication within 7 months of completing the survey required under regulation 5.4 of MARPOL Annex VI.

Item 5 was revised acoording to MEPC 324(75) and 332(76) as below:

……

That falls into one or more of the categories defined in Regulation 2.25 to 2.35, 2.38 and 2.39 of MARPOL 73/78 ANNEX VI. Attained EEDI shall be calculated in accordance with IMO Resolution MEPC 308(73) as amended by MEPC 322(74) and MEPC 332(76) "2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS" and Part II of Industry Guidelines.

……

(Additional information: In determining a ship's attained Energy Efficiency Design Index (EEDI) as per resolution MEPC 308(73), as amended by MEPC.322(74) and MEPC 332(76). a lower threshold for the minimum installed propulsion power for bulk carriers, oil and chemical tankers and combination carriers is needed. The method for determining this lower minimum threshold is contained in MEPC 232 (65) as amended by MEPC 255(67) and 262(68), "2013 Interim Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions") and the Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions (MEPC.1/Circ.850/Rev.3)

……

Parameter	Description	Unit
C_F	The conversion factor of the fuel type used for EIAPP cert. in NO_X Tech. File of all main and auxiliary engines (MEPC.308(73), as amended by MEPC.322(74) and MEPC 332(76) .)	g CO_2/g fuel
Δ	The displacement should be taken from the loading manual / preliminary trim and stability booklet.	t
DWT	The deadweight should be taken from the loading manual / preliminary trim and stability booklet, alternatively a freeboard calculation.	t
$f_{eff(i)}$	The availability factor for each innovative energy efficiency technology shall be based on comprehensive documentation of the determination for each innovative energy efficiency technology For waste heat recovery systems $f_{eff(i)}$ shall be set to one.	
f_i	For ice-classed ships f_i is determined by the standard given in MEPC. 308(73), as amended by MEPC.322(74) and MEPC 332(76) . Documentation on intended ice class	
f_j	For ships with planned ice class f_j is given in MEPC. 308(73), as amended by MEPC.322(74) and MEPC 332(76) . Documentation on intended ice class	
f_w	Refer to MEPC.1/Circ. 796	
f_c	Cubic capacity correction factor given in MEPC. 308(73), as amended by MEPC.322(74) and MEPC 332(76) .	
f_l	For general cargo ships equipped with cranes and other cargo-related gear to compensate in a loss of deadweight of the ship	

f_m	For ice-classed ships having IA Super or IA f_m is determined by the standard given in MEPC. 308(73), as amended by MEPC.322(74) and MEPC 332(76) . Documentation on intended ice class	
GT	GT shall be calculated acc. to the International Convention of Tonnage Measurements of ships 1969, corresponding documentation shall be submitted	
Lightweight	The lightweight shall be taken from the loading manual / preliminary trim and stability booklet.	t
P_{AE}	- If Σ $MCR_{ME(i)} > 10{,}000$ Kw, P_{AE} shall be calculated as: $P_{AE} = 0.025 \cdot (MCR_{ME} + 250)$ - If Σ $P_{ME(i)} < 10{,}000$ Kw, P_{AE} shall be: $P_{AE} = 0.05 \cdot MCR_{ME}$ - For LNG Carriers with a reliquiefaction system or compressor(s) extra items, in accordance with MEPC. 308(73), as amended by MEPC.322(74) and MEPC 332(76) ., to be added to above P_{AE} formulations, is to be provided. For ship where the P_{AE} value calculated as above is significantly different from the total power used at normal seagoing condition, The P_{AE} calculation in accordance with MEPC. 308(73), as amended by MEPC.322(74) and MEPC 332(76) ., (see also MEPC. 308(73) as amended by MEPC.322(74) and MEPC 332(76) Appendix 2 for guidance), is to be provided.	kW

Item 6 was revised acoording to MEPC 324(75) and 332(76) as below:

……..

.27 "Tanker" in relation to chapter 4 means an oil tanker as defined in MARPOL Annex I, regulation 1 or a chemical tanker or an NLS tanker as defined in MARPOL Annex II, regulation 1. (**Additional information:** Fruit Juice carriers shall be categorized as "Refrigerated cargo carriers" as agreed by MEPC 64, refer to MEPC.1/Circ 795/Rev.5)

……..

Ship Type	Reference line
Bulk carrier	$961.79 \times DWT^{-0.477}$
	Applicable from 01.04.2022 where DWT≤279,000 $961.79 \times DWT^{-0.477}$ where DWT > 279,000* $961.79 \times 279{,}000^{-0.477}$
Gas carrier	$1120.00 \times DWT^{-0.456}$
Tanker	$1218.80 \times DWT^{-0.488}$
Container ship	$174.22 \times DWT^{-0.201}$
General cargo ship	$107.48 \times DWT^{-0.216}$
Refrigerated cargo carrier	$227.01 \times DWT^{-0.244}$
Combination carrier	$1219.00 \times DWT^{-0.488}$

Ro-ro cargo ship (vehicle carrier)	DWT/GT<0.3 $(DWT/GT)^{-0.7}$ x780.36x$DWT^{-0.471}$ DWT/GT>0.3 1812.63x$DWT^{-0.471}$
Ro-ro cargo ship	1405.15x$DWT^{-0.498}$
	where DWT≤17,000** 1686.17** x$DWT^{-0.498}$ where DWT > 17,000** 1686.17** x$17,000^{-0.498}$
Ro-ro passenger ship	752.16x$DWT^{-0.381}$
	where DWT≤10,000* 902.59* x$DWT^{-0.381}$ where DWT > 10,000* 902.59* x$10,000^{-0.381}$
LNG Carrier	2253.7x$DWT^{-0.474}$
Cruise passenger ship having non-conventional propulsion	170.84x$GT^{-0.214}$

* to be used from phase 2 and thereafter

……..

Ship Type	**Size (DWT)**	**EEDI Reduction factor (X)**					
		Phase 0	**Phase 1**	**Phase 2**	**Phase 2**	**Phase 3**	**Phase 3**
		1 Jan. 2013- 31 Dec. 2014	**1 Jan 2015- 31 Dec. 2019**	**1 Jan. 2020- 31 Mar. 2022**	**1 Jan. 2020- 31 Dec. 2024**	**1 Apr 2022 -**	**1 Jan. 2025 -**
Bulk carrier	20,000 -	0 %	10 %		20 %		30 %
	10,000 – 20,000	n/a	0 - 10 %		0 - 20 %		0 - 30 %
Gas carrier	15,000 -	0	10 %	20 %		30 %	
	10,000 – 15,000	0 %	10 %		20 %		30 %
	2,000 – 10,000	n/a	0 - 10 %		0 - 20 %		0 - 30 %
Tanker	20,000 -	0 %	10 %		20 %		30 %
	4,000 – 20,000	n/a	0 - 10 %		0 - 20 %		0 - 30 %
Container ship	200,000	0 %	10 %	20 %		50 %	
	120,000 – 200,000	0 %	10 %	20 %		45 %	
	80,000 – 120,000	0 %	10 %	20 %		40 %	
	40,000 – 80,000	0 %	10 %	20 %		35 %	
	15,000 – 40,000	0 %	10 %	20 %		30 %	

	10,000 – 15,000	n/a	0 -10 %	0 - 20 %		15 - 30 %	
General cargo ship	15,000 -	0 %	10 %	15 %		30 %	
	3,000 – 15,000	n/a	0 -10 %	0 - 15 %		0 - 30 %	
Refrigerated cargo carrier	5,000 -	0 %	10 %		15 %		30 %
	3,000 – 5,000	n/a	0 -10 %		0 - 15 %		0 - 30 %
Combination carrier	20,000 -	0 %	10 %		20 %		30 %
	4,000 – 20,000	n/a	0 -10 %		0 - 20 %		0 - 30 %
LNG carrier*	10000 -	n/a	10 %**	20 %		30 %	
Ro-ro cargo ship* (vehicle carrier)	10000 -	n/a	5 %**		15 %		30 %
Ro-ro cargo ship*	2000 -	n/a	5 %**		20 %		30 %
	1000 – 2000	n/a	0 -5 %**		0 - 20 %		0 - 30 %
Ro-ro passenger ship*	1000 -	n/a	5 %**		20 %		30 %
	250 – 1000	n/a	0 -5 %**		0 - 20 %		0 - 30 %
Cruise passenger ship* having non-conventional propulsion	85000 GT -	n/a	5 %**	20 %		30 %	
	25000 – 85000 GT	n/a	0 -5 %**	0 - 20 %		0 - 30 %	

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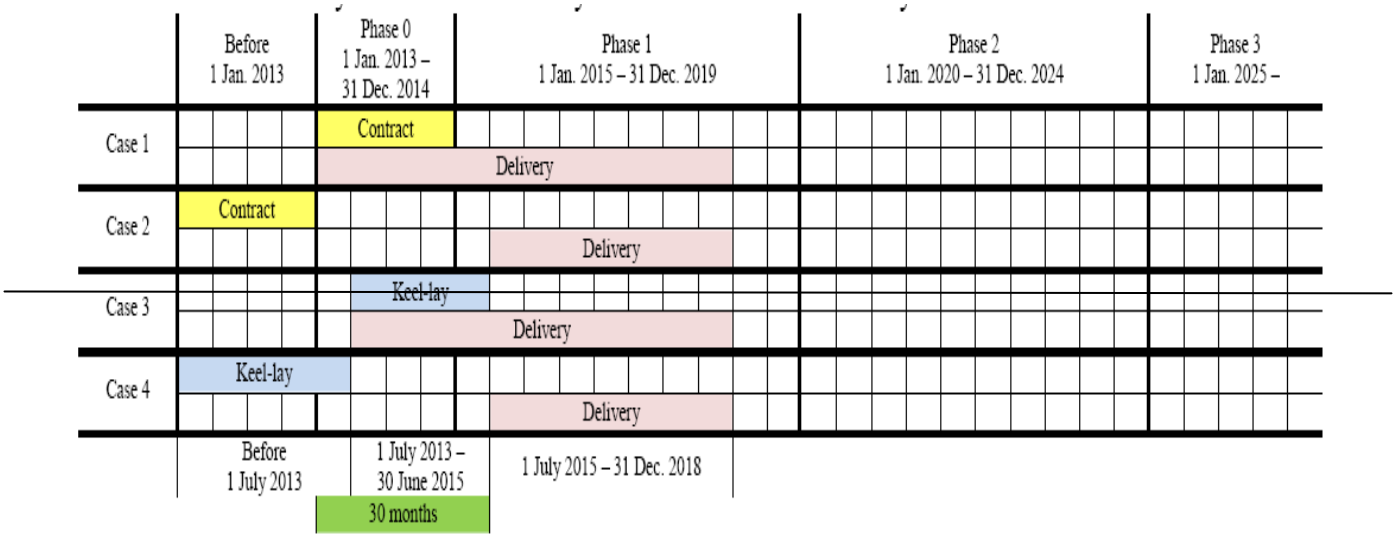
Summary table for applicability of phases to new ships where Phase 3 commences with 1 April 2022 and onwards

Delivery \ Contract	Before 1 Jan. 2013	1 Jan. 2013 - 31 Dec. 2014	1 Jan. 2015 - 31 Dec. 2019	1 Jan. 2020 - 31 Mar. 2022	1 Apr. 2022 -
Before 1 July 2015	n/a	Phase 0	Phase 1	-	-
1 July 2015 – 31 Dec. 2018	Phase 0	Phase 0	Phase 1	-	-
1 Jan. 2019 – 31 Dec. 2023	Phase 1	Phase 1	Phase 1	Phase 2	-
1 Jan. 2024 – 31 Mar. 2026	Phase 2	Phase 2	Phase 2	Phase 2	Phase 3
1 Apr. 2026 -	Phase 3	Phase 3	Phase 3	Phase 3	Phase 3

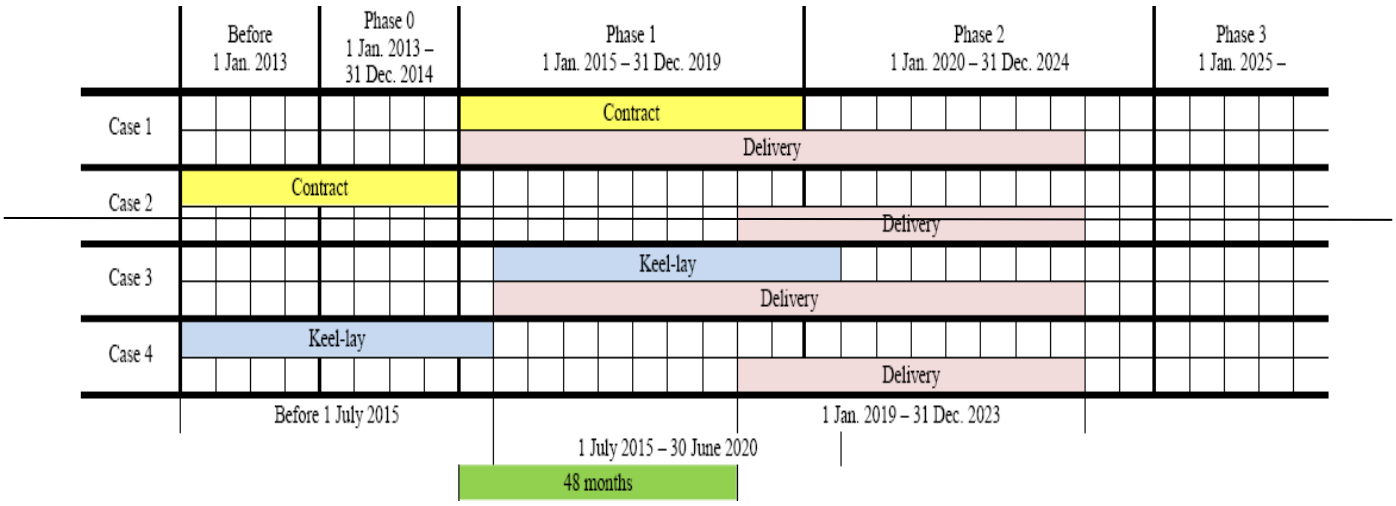
(In the absence of a building contract)

Delivery \ Keel-lay	Before 1 July. 2013	1 July. 2013 - 30 June. 2015	1 July. 2015 - 30 June. 2020	1 July. 2020 - 30 Sep. 2022	1 Oct. 2022 -
Before 1 July 2015	n/a	Phase 0	-	-	-
1 July 2015 – 31 Dec. 2018	Phase 0	Phase 0	Phase 1	-	-
1 Jan. 2019 – 31 Dec. 2023	Phase 1	Phase 1	Phase 1	Phase 2	-
1 Jan. 2024 – 31 Mar. 2026	Phase 2	Phase 2	Phase 2	Phase 2	Phase 3
1 Apr. 2026 -	Phase 3	Phase 3	Phase 3	Phase 3	Phase 3

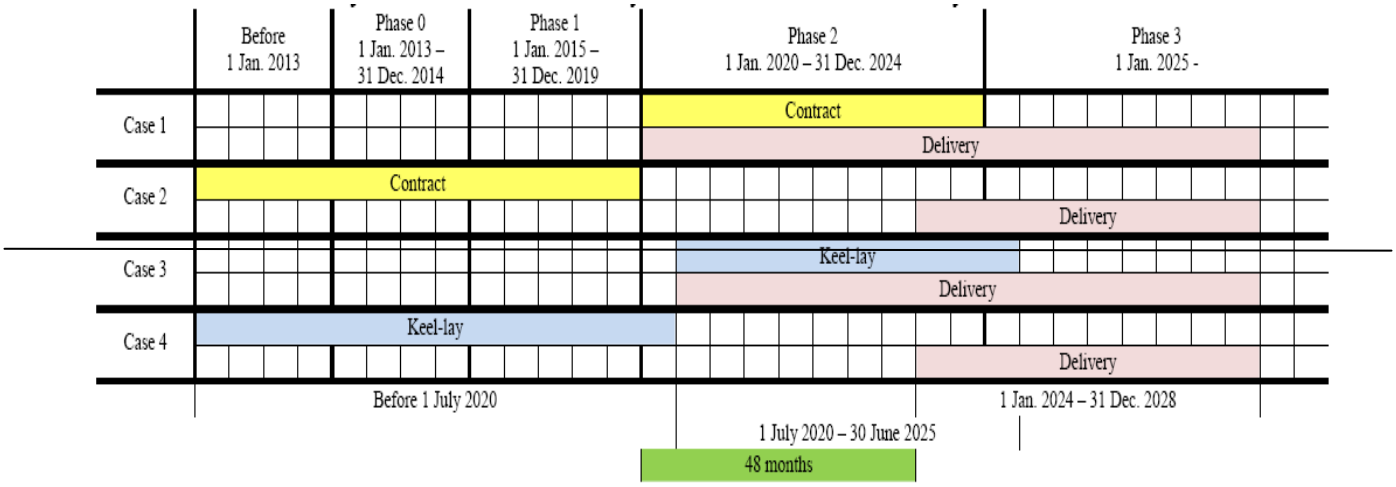
~~The required EEDI of Phase 0 is applied to the following new ship:~~



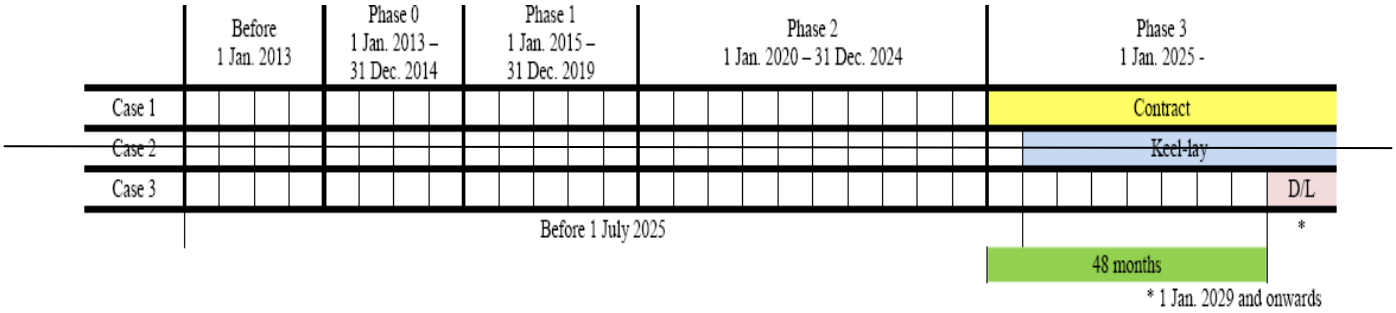
~~The required EEDI of Phase 1 is applied to the following new ship:~~



~~The required EEDI of Phase 2 is applied to the following new ship:~~



~~The required EEDI of Phase 3 is applied to the following new ship:~~



Useful reference documents was revised acoording to MEPC 324(75) and 332(76) as below:

……..

RESOLUTION MEPC.308(73) as amended by MEPC 322(74) and MEPC 332(76): 2018 GUIDELINES ON THE METHOD OF CALCULATION OF THE ATTAINED ENERGY EFFICIENCY DESIGN INDEX (EEDI) FOR NEW SHIPS

……..

MEPC.1/Circ 795/Rev.5: UNIFIED INTERPRETATIONS TO MARPOL ANNEX VI

……..

MEPC.1/Circ.850/Rev.3: GUIDELINES FOR DETERMINING MINIMUM PROPULSION POWER TO MAINTAIN THE MANOEUVRABILITY OF SHIPS IN ADVERSE CONDITIONS

GUIDELINES – GUIDELINES for EXHAUST GAS CLEANING SYSTEMS

01. Section B – SCR – Selective Catalytic Reduction Systems

Revision Date: September 2021

Entry into Force Date: 1 January 2022

Item B.6.2.3.1 in "Guidelines for Exhaust Gas Cleaning Systems" was revised according to UR M77 Rev.2 as below:

6. SCR System Piping

6.1 Exhaust Gas Piping Systems

……..

6.2 Reductant Piping Systems – Urea Solution

……..

6.2.3 Arrangement of the Urea Storage Tank

6.2.3.1 Reductant using urea based ammonia (e.g. 40%/60% urea/water solution)

i) Where urea based ammonia (e.g. AUS 40 – aqueous urea solution specified in ISO 18611-1-2014) is introduced, the storage tank is to be arranged so that any leakage will be contained and prevented from making contact with heated surfaces. All pipes or other tank penetrations are to be provided with manual closing valves attached to the tank. Tank and piping arrangements are to be approved.

02. Section C – EGCS – SOx

Revision Date: November 2021

Entry into Force Date: 1 January 2022

Item C.1 was revised according to MEPC.1/Circ.883 and MEPC.1/Circ.883/rev.1 as below:

1. General

This subsection provides requirements on the arrangements and system design for exhaust gas cleaning systems designed primarily for the removal of SO_x emissions, or scrubbers, as they are commonly known. The intent is that these requirements supplement the statutory emissions performance testing, survey, and certification requirements of the applicable IMO Regulations and Guidelines. At the time of issuance of this Guideline, the applicable Guidelines for SO_x exhaust gas cleaning systems are *2015 Guidelines for Exhaust Gas Cleaning Systems*, adopted by IMO Resolution MEPC.259(68). *Guidance on indication of ongoing compliance in the case of the failure of a single monitoring instrument, and recommended actions to take if the Exhaust Gas Cleaning System (EGCS) fails to meet the provisions of the EGCS Guidelines* (MEPC.1/Circ.883/Rev.1) may be considered in the case of system failure.

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