TÜRK LOYDU RULE CHANGE SUMMARY

TL NUMBER: 01/2024 JUNE 2024

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

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CHAPTER 105- NAVAL SHIP TECHNOLOGY, ELECTRICAL INSTALLATION

01 Section 5

02 Section 10

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CHAPTER 107- NAVAL SHIP TECHNOLOGY, SHIP OPERATION INSTALLATIONS AND AUXILIARY SYSTEMS

01 Section 8

02 Section 20

Regulations for the Performance of the Type Tests Part 1 - Test Specification for Type Approval

01 General

ADDITIONAL RULE FOR EXHAUST GAS CLEANING SYSTEMS

01 General

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Note: In addition to below indicated revisions, TL equivalent resolutions (TL-R, TL-I, TL-PR) and Guidelines based on IACS Recommendations (TL-G) referenced from TL Rules were replaced by IACS Resolutions and Recommendations. It is important to note that these changes were not indicated as vertical lines in TL Rules and in this Rule Change Summary.

CLASSIFICATION AND SURVEYS

01. Section 02 – Classification

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item B.3.3.1.1.3 was revised according to PR 1A Rev.9 as below:

- For oil tankers (including product carriers), and chemical ~~carriers~~ tankers of 10 years of age and above but less than 15 years of age, in lieu of an internal inspection of cargo tanks without internal stiffening and framing, inspections of surrounding ballast tank(s) and void spaces and deck structure, are to be applied.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Table 2.11 was revised as below:

Table 2.11 Ship type notations for floating docks and dock gates

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
FLOATING DOCK (…) Lifting capacity ... t	Notation assigned to the ships complying with relevant TL Rules and indicating lifting capacity in tonnes. (…) is to be filled with port of operation. e.g FLOATING Dock (TUZLA Port) Lifting capacity 10000 t	Floating docks	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - Part A Chapter 1 Section 35	Classification and Surveys Section 3 and Section 3, K.2
Dock Gate (…)	Notation assigned to the dock gates complying with relevant TL Rules. (…) is to be filled with the service location of the Dock Gate e.g. Dock Gate (HALİÇ Dock No:1).	Dock Gates	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 – Machinery)	Classification and Surveys Section 3 and Section 3, K.2

Table 2.12 was revised as below:

Table 2.12 Ship type notations for special service vessels

PILOT BOAT	This notation is assigned to ships engaged in pilotage services.	Pilot Boats	Part C Chapter 34 Tentative Rules for the Classification of Special Crafts - Patrol Boat	Classification and Surveys Section 3
PONTOON	This notation is assigned to non propelled units intended to carry cargo and/or equipment on deck only. For pontoons with a permanently fitted crane, **PONTOON CRANE** notation is to be assigned.	Pontoons	Part A Chapter 1 Section 33	Classification and Surveys Section 3 and Section 3 K.4
…	…	…	…	…
SUCTION HOPPER DREDGER	This notation is given to ships that perform dredging operations with suction pipes and are specially designed to transport the dredged material to the ship.	Suction Hopper Dredger	Part A Chapter 1 Section 34	Classification and Surveys Section 3
SPLIT HOPPER DREDGER	Ships which can split over its longitudinal axis and specially equipped for dredging activities and carrying spoils or dredged material	Split Hoppers Dredgers	Part A Chapter 1 Section 34	Classification and Surveys Section 3
…	…	…	…	…
OIL RECOVERY VESSEL	Seagoing and inland waterway steel vessels with and without their own means of propulsion which are intended for service in the event of accidental oil spills. Following notations may also be assigned. “Without cargo tanks” "Not suitable for products with a flashpoint of 60°C and less” In addition, for other ship types e.g. “Tug”, “Supply Vessel” and suitable for operation in oil-covered waters may be assigned the notation “Suitable for use oil-covered waters”	Oil Recovery Vessels	Part C Chapter 12 Oil Recovery Vessels	Classification and Surveys Section 3 and Section 3, K.3
CHEMICAL RECOVERY VESSEL	Seagoing and inland waterway steel vessels with and without their own means of propulsion which are intended for service in the event of accidental chemical material spills.	Chemical Recovery Vessels	Part C Chapter 24 Chemical Recovery Vessels	Classification and Surveys Section 3
…	…	…	…	…
INDUSTRIAL	Ships as defined in the	Industrial	Part C Chapter 38 Rules for	Classification

PERSONNEL SHIP	International Code of Safety for Ships Carrying Industrial Personnel (IP Code)	Personnel Ship	the Ships Carrying Industrial Personnel	and Surveys Section 3

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Table 2.14 was revised according to UR Z11 Rev.6 as below:

Class Notation		Description	Application	Rule Requirement, Design	Rule Requirement, Survey
OIL TANKER	**ESP**	The ship type notation **OIL TANKER**, or equivalent, and the notation **ESP** shall be assigned to sea going self-propelled ships which are constructed ~~generally~~ with integral cargo tanks and intended primarily to carry oil in bulk. This type notation shall be assigned to tankers of both single and double hull construction, as well as tankers with alternative structural arrangements, e.g. mid-deck designs. **(1), (4)**	Oil Tankers	-	Classification and Surveys Section 3 A.4.14

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Table 2.29 was revised as below:

Table 2.29 Notations for environmental standards

Class Notation	Description	Application	Rule Requirement, Design	Rule Requirement, Survey
.....	.....		.....	.....
EGCS-SOx	For ship equipped with scrubber to reduce SOx designed, constructed, and tested according to Exhaust Gas Cleaning Systems Guideline.		**TL** Guidelines For Exhaust Gas Cleaning Systems, item C	**TL** ~~Guidelines~~ Additional Rules For Exhaust Gas Cleaning Systems, item C, D and E. Guidelines for exhaust gas cleaning systems (MEPC 259(68)).
EEMONS	For ship equipped with permanently installed exhaust emission monitoring system designed, constructed, and tested according to Exhaust Gas Cleaning Systems Guideline.		**TL** Guidelines For Exhaust Gas Cleaning Systems, item D.	

Table 2.56 was revised according to UR E26 Rev.1 as below:

Table 2.56 Notations for cyber security

Class Notation	Characteristics	Underlying rules
CYBER-SECURE	This notation is assigned for ships which their related systems, management policies and procedures to enable resilient operation against cyber risks in compliance with ~~Guidelines on~~ Additional Rule for Cyber ~~Security~~ Resilience of Ships ~~and Offshore Units~~	~~Guidelines on~~ Additional Rule for Cyber ~~Security~~ Resilience of Ships ~~and Offshore Units~~
CYBER-MANAGED	This notation is assigned for ships which have safety and security management policies and procedures to enable resilient operation against cyber risks	Guidelines on Cyber Security for Ships and Offshore Units, Section 2

02. Section 03 – Surveys

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.1.10 was revised according to UR Z10.1 Rev.25 as below:

1.10 An Oil Tanker is a ship which is constructed primarily to carry oil in bulk in cargo tanks forming an integral part of the ship's hull, ~~and~~ includ~~es~~ing ship types such as combination carriers (Ore/Oil ships etc.) but excluding ships carrying oil in independent tanks not part of the ship's hull such as asphalt carriers.

A Double Hull Oil Tanker is a ship which is constructed primarily for the carriage of oil (MARPOL Annex I cargoes) in bulk, which have the cargo tanks forming an integral part of the ship's hull and is protected by a double hull which extends for the entire length of the cargo area, consisting of double sides and double bottom spaces for the carriage of water ballast or void spaces.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.15.1.2 was revised according to UR Z10.3 Rev.21 as below:

15.1.2 Main structural plans of cargo and ballast holds or tanks (for CSR ships these plans are to include for each structural element both the as-built and renewal thickness. Any thickness for voluntary addition is also to be clearly indicated on the plans. The midship section plan to be supplied on board the ship is to include the minimum allowable hull girder sectional properties for hold transverse section in all cargo holds), previous repair history, cargo and ballast history, extent of use of inert gas plant and tank cleaning procedures, records of inspections and actions by ship's personnel for structural deterioration, leakage in bulkheads and piping, condition of coating or corrosion prevention system, if any, a guidance for reporting is shown in Tables of UR Z10s and any other information identifying critical structural areas and/or suspect areas requiring inspection.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item B.3.5.4 was revised according to UR Z10.3 Rev.21 as below:

3.5.4 Examination of double-side skin void spaces for bulk carriers exceeding 20 years of age and of 150 m in length and upwards

Examination of double-side skin void spaces, for bulk carriers exceeding 20 years of age and of 150 m in length and upwards, are to be carried out when required as a consequence of the results of the renewal survey (as required by para 2.2.3.3 of UR Z10.5) and intermediate survey (as required by C.3.4.2.1). When considered necessary by the Administration, or when extensive corrosion exists, thickness measurements should be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements should be increased in accordance with table IV. These extended thickness measurements should be carried out before the survey is credited as completed. Suspect areas identified at previous surveys should be examined. Areas of substantial corrosion identified at previous surveys should have thickness measurements taken.
For bulk carriers built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in good condition.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item B.5 was added according to UR E26 Rev.1 as below:

5. Cyber Resilience

Cyber resilience survey is to be carried out according to Additional Rule for Cyber Resilience of Ships (UR E26 and E27). Also first annual survey is to be carried out according to the Additional Rule.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.3.3.1.1 was revised according to UR Z10.2 Rev.37 as below:

.....

- Where ~~poor coating~~ a hard coating is found to be in less than GOOD condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination is to be extended to other ballast tanks of the same type.
- In ballast tanks other than double bottom tanks, where a hard protective coating is found ~~in poor~~ to be in less than GOOD condition, and it is not renewed, or where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual intervals.

.....

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.3.4.1.1 was revised according to UR Z10.5 Rev.20 as below:

.....

- Where ~~poor coating~~ a hard coating is found to be in less than GOOD condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination is to be extended to other ballast tanks of the same type.

- In ballast tanks other than double bottom tanks, where a hard protective coating is found ~~in poor~~ to be in less than GOOD condition, and it is not renewed, or where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual intervals. When such breakdown of hard protective coating is found in ballast double bottom tanks, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

Item D.2.6.1.8.1 was revised according to UR Z10.1 Rev.25 as below:

Cargo tank testing carried out by the ~~vessel~~ship's crew under the direction of the Master may be accepted by the surveyor provided the following conditions are complied with:

– a tank testing procedure, specifying fill heights, tanks being filled and bulkheads being tested, has been submitted by the owner and reviewed by **TL** prior to the testing being carried out;

– the tank testing is carried out prior to overall survey or close-up survey;

– the tank testing is carried out within the class renewal survey window and not more than 3 months prior to the date on which the overall or close up survey is completed;

– the tank testing has been satisfactorily carried out and there is no record of leakage, distortion or substantial corrosion that would affect the structural integrity of the tank;

~~– the tank testing has been satisfactorily carried out within class renewal survey window not more than 3 months prior to the date of the survey on which the overall or close up survey is completed;~~

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item D.4 was added according to UR E26 Rev.1 as below:

4. Cyber Resilience

Cyber resilience survey is to be carried out according to Additional Rule for Cyber Resilience of Ships (UR E26 and E27).

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item K.17 was added according to IP Code as below:

17. Ships Carrying Industrial Personnel

See special rules for Classification and Construction of Ships Carrying Industrial Personnel.

PART A – CHAPTER 1 - HULL

01. Section 1 – General, Definitions

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items A.1 and B.2 were revised as below:

A. Validity, Equivalence

1. The Rules apply to seagoing steel ships classed **1 A 5** whose breadth to depth ratio is within the range common for seagoing ships and the depth **H** of which is not less than:

- **L**/16 for unlimited range of service and **Y** (Restricted International Service)

- **L**/18 for **K6**, **K50** or **K20** (Coastal Service)

- **L**/19 **L1** or **L2** (Harbour Service).

……

2. For the definition of the service ranges **Y, K6, K50, K20, L1** and **L2** see "Classification and Surveys" Section 2, D.2.4.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item H.5 was revised according to UR S10 Rev.7 as below:

5. Ship's Speed v_o : Maximum ahead service speed in knots, is the greatest speed which the ship is designed to maintain in service at the ~~summer load line~~ deepest seagoing draught and at the propeller RPM corresponding to MCR (Maximum Continuous Rating).

02. Section 3 – Design Principles

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C was totally revised according to UR S35 New.

03. Section 11 – Equipment

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items 3.2 and 3.3 were revised and Table 11.1 was added as below:

3. Watertight Subdivision

……

3.~~3~~2 Total number of watertight transverse bulkheads shall not be less than given in Table 11.1. For ships which require proof of survival capability in damaged conditions, the watertight subdivision will be determined by damage stability

calculations. For oil tankers see Section 28, for passenger vessels see Section 30, for special purpose ships see Section 31, for cargo ships of more than ~~100~~ 80 m. in length see Section 26 and for supply vessels see Section 32.

Table 11.1 Number of bulkheads according to the length of the ship

Length (m)	Number of bulkheads for ships with aft machinery **(1)**	Number of bulkheads for other ships
L < 65	3	4
65 ≤ L < 85	4	5
85 ≤ L < 105	4	5
105 ≤ L < 120	5	6
120 ≤ L < 145	6	7
145 ≤ L < 165	7	8
165 ≤ L < 190	8	9
L ≥ 190	To be defined on a case by case basis	
(1) After peak bulkhead and aft machinery bulkhead are the same		

3.2~~2~~3 Number and location of transverse bulkheads fitted in addition to those specified in 3.1 are to be so selected as to ensure sufficient transverse strength of the hull.

Subsequent tables were renumbered according to addition of Table 11.1.

04. Section 13 – Superstructures and Deckhouses

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items C.3.2 was added according to UR S3 Rev.2 as below:

t = thickness of plating (mm), not less than the minimum thickness as follows:

$$t_{min} = \left(5.0 + \frac{L}{100}\right)\sqrt{k}$$ for the lowest tier

$$t_{min} = \left(4.0 + \frac{L}{100}\right)\sqrt{k}$$ for the upper tiers, however, not less than 5.0 mm.

For ships with L < 65 m, the minimum thickness of plating should be as follows:

t_{min} = 5 mm for the lowest unprotected front

4 mm for all other cases

05. Section 15 – Hatchways

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Title of item A was revised and item B was merged into according to UR S21 Rev.as below:

A. Hatch Covers

1. Application and definitions

~~**1.1** This section is applicable to all ships except bulk carriers, self-unloading bulk carriers, ore carriers and combination~~

~~carriers (see Section 27, G), as defined in Classification and Surveys, Section 2 item D.2.6 (Table 2.14), and are for all cargo hatch covers and coamings on exposed decks. Special requirements of National Administrations regarding hatchways, hatch covers, tightening and securing arrangements are to be observed.~~

1.1 Application

These requirements apply to all ships except CSR bulk carriers and are for all cargo hatch covers and coamings on exposed decks.

As specified in this subsection, parts of the requirements are for some specific ship types as categorized below:

- Type-1 ships, including all ships except bulk carriers, self-unloading bulk carriers, ore carriers and combination carriers, as defined in UR Z11.
- Type-2 ships, including all bulk carriers, self-unloading bulk carriers, ore carriers and combination carriers, as defined in UR Z11.

The strength requirements are applicable to hatch covers and hatch coamings of stiffened plate construction and its closing arrangements.
This section is applicable to hatch covers and coamings made of steel. In case of alternative materials and innovative designs the approval is subject to the TL.
This section does not apply to portable covers secured weathertight by tarpaulins and battening devices, or pontoon covers, as defined in ICLL Regulation 15.
Hatch covers and hatch coamings of fishing vessels are to comply with the requirements of TL.

These requirements are in addition to the requirements of the ICLL.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items A.2 and 3 were deleted and A.4 was renumbered as 1.2 and revised according to UR S21 Rev. as below:

1.2 Definitions

ICLL Where ICLL is referred to in the text, this is to be taken as the International Convention on Load Lines, 1966 as amended by the 1988 protocol, as amended in 2003.

Note:
Modern hatch cover designs of lift-away-covers (also called lift-on/lift-off, or just simply LoLo covers) are in many cases called pontoon covers. This definition does not fit to the definition above. Modern lift-away hatch cover designs should belong to one of the two categories single skin covers or double skin cover.

1.2.2 Positions

The hatchways are classified according to their position as follows:

Position 1 Upon exposed freeboard and raised quarterdecks, and upon exposed superstructure decks situated forward of a point located a quarter of ship's length from forward perpendicular.

Position 2 Upon exposed superstructure decks situated abaft a quarter of the ship's length from the forward perpendicular and located at least one standard height of the superstructure above the freeboard deck.

Upon exposed superstructure decks situated forward of a point located a quarter of the ship's length from the forward perpendicular and located at least two standard height of the superstructure above the freeboard deck.

~~p = Design load [kN/m^2] for hatch covers of respective load cases A to D according to B.~~

~~= P_H for vertical loading on hatch covers~~

~~= P_A for horizontal loading on edge girders (skirt plates) of hatch covers and on coamings according to Section 13, C.2.~~

~~= Liquid pressure P_T~~

~~= P_{SC} + P_{DC} for cargo loads on hatch covers according to Section 5, C.4.1 and Section 5, D.6.1.~~

~~P_T = P_{ST} + P_{DT}~~

~~= P_{T1}, P_{T2}, P_{T3}, P_{T4} or P_{T5}~~

~~the greatest value is to be used.~~

~~P_T = Design tank pressure load [kN/m^2] according to Section 5, C.3 and Section 5, D.8~~

~~x = Distance of midpoint of the assessed hatch cover from aft end of length L or L_c, as applicable~~

~~L = Length of ship, in m, as defined in Section 1.~~

~~L_{LL} = Length of ship, in m, as defined in ICLL Regulation 3~~

~~h_N = Superstructure standard height according to ICLL~~

~~= 1,05 + 0,01 L_c [m]; 1,8 ≤ h_N ≤ 2,3~~

~~D_{min} = The least moulded depth, in m, as defined in ICLL Regulation 3~~

~~l = Unsupported span [m] of stiffener, to be taken as the spacing of main girders or the distance between a main girder and the edge support for hatch covers and as the spacing of coaming stays for hatch coamings, as applicable~~

~~a = Spacing of stiffeners [m]~~

~~t = Thickness of structural member [mm]~~

~~= t_{net} + t_K~~

~~t_{net} = Net thickness [mm]~~

~~t_K = Corrosion addition acc. to 4.1, Table 15.1~~

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.5 was renumbered as A.7.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.1 was revised according to UR S21 Rev.6 as below:

~~**B. Hatch Covers**~~
~~**1. General Requirements**~~
~~**1.1 Structural Arrangement**~~
1.4 General requirements

~~**1.1.1**~~ Primary supporting members and ~~secondary~~ stiffeners of hatch covers are to be continuous over the breadth and length of hatch covers, as far as practical. When this is impractical, sniped end connections are not to be used and appropriate arrangements are to be adopted to provide sufficient load carrying capacity.

~~**1.1.2**~~ Generally, the spacing of primary supporting members parallel to the direction of secondary stiffeners is not to exceed 1/3 of the span of primary supporting members. ~~When~~ If sufficient strength ~~calculation is carried out by~~ based on FE analysis ~~according to 4.4~~ can be verified, this requirement ~~can~~ may be waived.

~~**1.1.3 Secondary**~~ Stiffeners of hatch coamings are to be continuous over the breadth and length of hatch coamings, as far as practical.

1.2~~3~~ Material

~~**1.2.1**~~ Hatch covers and coamings are to be made of material in accordance with the definitions of ~~Section 3~~ IACS UR S6.

~~**1.2.2**~~ Material class I is to be applied for top plate, bottom plate and primary supporting members.

Item A.1.5 was added according to UR S21 as below:

1.5 Net scantling approach

Unless otherwise quoted, the thicknesses t of the following sections are net thicknesses**.**
The net thicknesses are the member thicknesses necessary to obtain the minimum net scantlings required by 3 and 5.
The required gross thicknesses are obtained by adding corrosion additions, tc, given in Table 15.8 in 7.1.
Strength calculations using FEM are to be performed with net scantlings.

Existing item A.2.3. was renumbered as 1.6.

Existing item B.2 was renumbered as A.2 and revised according to UR S21 Rev.6 as below:

2. Hatch Cover and Coaming Load Model

Structural assessment of hatch covers and hatch coamings is to be carried out using the design loads, defined in this

subsection

Definitions

L = Length of ship, in m, as defined in Section 1 item H.2.1

L_c = freeboard length of ship, in m, as defined in ICLL Regulation 3

x = Longitudinal coordinate of midpoint of assessed structural member measured from aft end of length L or L_{LL}, as applicable

D_{min} = the least moulded depth, in m, as defined in ICLL Regulation 3

h_N = standard superstructure height in m

= $1,05 + 0,01L_{LL}$, $1,8 \leq h_N \leq 2,3$

Existing item B.2.1 was revised according to UR S21 Rev.6 as below:

……

For hatch covers of cargo holds designed for carriage of ballast or liquid cargo, the internal lateral pressures are also to be considered according to TL Rules.

Existing item B.2.2 was divided to two sub items according to UR S21 Rev.6 as below:

2.2.1 General horizontal weather design load

……

2.2.2 Horizontal weather design load applicable to coamings of Type-2 ships

The pressure P_{coam}, in kN/m^2, on the No. 1 forward transverse hatch coaming is given by:

P_{coam} = 220, when a forecastle is fitted in accordance with Section 27 item B.3.2

= 290 in the other cases

The pressure P_{coam}, in kN/m^2, on the other coamings is given by:

P_{coam} = 220

Note:

The horizontal weather design load P_A and P_{coam} need not be included in the direct strength calculation of the hatch cover, unless it is utilized for the design of substructures of horizontal support according to 6.2.3.

Titles were added to existing items B.2.4.1, 2.4.2 and 2.4.3 according to UR S21 Rev.6 as below:

2.4.1 General

……

2.4.2 Corner loads for ship in upright condition

……

2.4.3 Corner loads for ship in heel condition

Existing item B.2.4.6 was deleted according to UR S21 Rev.6 as below:

~~**2.4.6 Hatch covers of hold spaces intended to be filled with liquids**~~

~~Hatch covers of hold spaces intended to be filled with liquids are to be designed for the loads specified in P_{ST} + P_{DT} according to Section 5 C.3.2.1 and Section 5 D.8.1.1 and D.8.2. irrespective of the filling height of hold spaces.~~

Existing item B.3.1.1 was revised according to UR S21 Rev.6 as below:

3.1.1 ~~Stresses~~ Yield strength

~~The equivalent stress σ_v in steel hatch cover structures related to the net thickness shall not exceed 0,8 · R_eH.~~
~~For design loads according to 2.2 to 2.5, the equivalent stress σ_v related to the net thickness shall not exceed 0.9 · R_{eH} when the stresses are assessed by means of FEM.~~

~~For steels with R_{eH} > 355 N/mm^2, the value of R_{eH} to be applied throughout this section is to be agreed with **TL** but is not to be more than the minimum yield strength of the material.~~
~~For grillage analysis, the equivalent stress may be taken as follows:~~

$$\sigma_V = \sqrt{\sigma^2 + 3\tau^2} \quad [\mathrm{N/mm^2}]$$

~~σ = $\sigma_b + \sigma_n$ [N/mm^2]~~

~~σ_b = Bending stress [N/mm^2]~~

~~σ_n = Normal stress [N/mm^2]~~

~~τ = Shear stress [N/mm^2]~~

~~For FEM calculations, the equivalent stress may be taken as follows:~~

All hatch cover structural members are to comply with the following formulae

$\sigma_v \leq \sigma_a$ for shell elements in general.

$\sigma_{\text{axial}} \leq \sigma_a$ for rod or beam elements in general.

Where:

σ_a : Allowable stress as defined in Table.15.4.

R_{eH} : Specified minimum yield stress, in N/mm^2, of the material.

σ_v : Von Mises stress, in N/mm², to be taken as follows:

Table 15.4 Allowable stresses

Members of	Subject to	σ_a in N/mm²
Hatch cover structure	External pressure, as defined in 2.1	0,80 R_{eH}
	Other loads, as defined in 2.2 to 2.5	0,90 R_{eH} for static + dynamic load case 0,72 R_{eH} for static load case

……

For steels with a minimum yield stress of more than 355 N/mm², the value of R_{eH} to be applied throughout this requirement is subject to TL, but is not to be more than the minimum yield stress of the material.

……

3.1.2 Deflections

~~The deflection f of weather deck hatch covers under the vertical design load PH shall not exceed:~~

~~f = 0,0056 ℓg [m]~~

~~ℓg = Largest span of girders [m]~~

The vertical deflection of primary supporting members due to the vertical weather design load according to 2.1 is to be not more than 0.0056 lg , where lg is the greatest span of primary supporting members.

~~3.1.3 Where hatch covers are made of aluminum alloys, Section 3, A.4. is to be observed. For permissible deflections 3.1.2 applies.~~

~~3.1.4 The permissible stresses specified under 3.1.1 apply to primary girders of symmetrical cross section. For unsymmetrical cross sections, e.g. sections, equivalence in regard to strength and safety is to be proved, see also Section 3, B.10.~~

……

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.2 was revised according to UR S21 Rev.6 as below::

……

σ_a = ~~0,8. σF [N/mm²]~~ as defined in Table 15.4

……

3.2.1 Local net plate thickness of hatch covers for wheel loading

The local net plate thickness of hatch covers for wheel loading have to be derived from TL Rules**.**

3.2.2 Lower plating of double skin hatch covers and box girders

……

When the lower plating is not considered as a strength member of the hatch cover, the thickness of the lower plating should be determined according to TL rules.

3.3 Net scantling of ~~secondary~~ stiffeners

The net section modulus W and net shear area A_s of uniformly loaded hatch cover stiffeners constraint at both ends must not be less than:

~~$W = 104\ ps\ell^2 / \sigma_F$ [cm³] for design load acc. to 2.1~~

~~$W = 93\ ps\ell^2 / \sigma_F$ [cm³] for design load acc. to 2.3.1~~

~~$AS = 10{,}8\ ps\ell / \sigma_F$ [cm²] for design load acc. to 2.1~~

~~$AS = 9{,}6\ ps\ell / \sigma_F$ [cm²] for design load acc. to 2.3.1~~

$W = ps\ell^2 / f_{bc}\ \sigma_a^2$ [cm³]

$A_S = 8{,}7\ ps\ell.\ 10^{-3} / \sigma_a$ [cm²]

……

ℓ = ~~Secondary~~ stiffener span, [m], to be taken as the spacing, [m], of primary supporting members or the distance between a primary supporting member and the edge support, as applicable. When brackets are fitted at both ends of all stiffener spans, the secondary stiffener span may be reduced by an amount equal to 2/3 of the minimum brackets arm length, but not greater than 10% of the unsupported span, for each bracket

s = ~~Secondary~~ stiffener spacing [m]

p = Pressure p_{HC} and p_L, in kN/m², as defined in 2.

f_{bc} = boundary coefficient of stiffener, taken equal to

f_{bc} = 8, in the case of stiffener simply supported at both ends or simply supported at one end and clamped at the other end

f_{bc} = 12, in the case of stiffener clamped at both ends

σ_a = allowable stress as defined in Table 15.4

For ~~secondary~~ stiffeners of lower plating of double skin hatch covers, requirements mentioned above are not applied due to the absence of lateral loads. For double skin hatch covers of holds designed for ballast or liquid cargo, the stiffeners on lower plating are to be strengthened according to TL rules.

……

The net section modulus of the ~~secondary~~ stiffeners is to be determined based on an attached plate width assumed equal to the stiffener spacing.

~~For flat bar secondary stiffeners and buckling stiffeners, the ratio h/t_w is to be not greater than $15 \cdot k^{0,5}$, where:~~

~~h = Height of the stiffener~~

~~tw = Net thickness of the stiffener~~

~~$k = 235/\sigma_F$~~

Stiffeners parallel to primary supporting members ~~and arranged within the effective breadth according to 3.5.1 must be continuous at crossing primary supporting member~~ and may be regarded for calculating the cross sectional properties of

primary supporting members. It is to be verified that the combined stress of those stiffeners induced by the bending of primary supporting members and lateral pressures does not exceed the permissible stresses according to 3.1.1. The requirements of this paragraph are not applied to stiffeners of lower plating of double skin hatch covers if the lower plating is not considered as strength member.

……

For hatch covers subject to wheel loading or point loads stiffener scantlings are to be determined under consideration of the permissible stresses according to 3.1.1 or are to be determined according to TL rules.

Existing item B.3.4.1 was revised according to UR S21 Rev.6 as below:

……

For all components of primary supporting members sufficient safety against buckling must be verified according to 3.6. ~~For biaxial compressed flange plates this is to be verified within the effective widths according to 3.6.3.2.~~

……

t = 6,5 · s. 10^{-3} [mm]

……

s = Stiffener spacing [mm]

Existing item B.3.4.2 was revised according to UR S21 Rev.6 as below:

……

$$t = 0,0158 \cdot s \cdot \sqrt{\frac{p_A}{0,95 \cdot R_{eH}}}$$

t = 8,5 .*s* . 10^{-3} [mm]

……

PA = Horizontal pressure as defined in 2.2.1

s = Stiffener spacing [mm]

~~The stiffness of edge girders is to be sufficient to maintain adequate sealing pressure between securing devices. The moment of inertia [cm4]of edge girders is not to be less than:~~

~~$I = 6 \cdot q \cdot s_{SD}^4$~~

~~where:~~

~~q = Packing line pressure [N/mm], minimum 5 N/mm~~

~~s_{SD} = Spacing [m] of securing devices~~

For the required moment of inertia of edge girders, refer to 6.1.4.

Existing item B.3.5 was revised according to UR S21 Rev.6 as below:

3.5 Strength calculations

~~Strength calculation for hatch covers may be carried out by either grillage analysis or FEM.~~
~~Double skin hatch covers or hatch covers with box girders are to be assessed using FEM, refer to 3.5.2.~~
The stresses in hatch covers are to be determined by FE analysis.

The stress calculation model in this section is to be used for both yielding and buckling strength assessments in accordance with 3.1 and 3.6, respectively.

The net scantlings as defined in 1.5 are to be used.

~~3.5.1 Effective cross-sectional properties for calculation by grillage analysis~~

~~Cross-sectional properties are to be determined considering the effective breadth. Cross sectional areas of secondary stiffeners parallel to the primary supporting member under consideration within the effective breadth can be included, refer Fig.15.6.~~

~~The effective breadth of plating e_m of primary supporting members is to be determined according to Tab.15.4, considering the type of loading. Special calculations may be required for determining the effective breadth of one-sided or non-symmetrical flanges.~~

~~The effective cross sectional area of plates is not to be less than the cross sectional area of the face plate.~~

~~For flange plates under compression with secondary stiffeners perpendicular to the web of the primary supporting member, the effective width is to be determined according to 3.6.3.2.~~

~~Table 15.4 Effective width e_m of primary supporting members~~

~~ℓ/e~~	~~0~~	~~1~~	~~2~~	~~3~~	~~4~~	~~5~~	~~6~~	~~7~~	~~≥8~~
~~e_{m1}/e~~	~~0~~	~~0.36~~	~~0.64~~	~~0.82~~	~~0.91~~	~~0.96~~	~~0.98~~	~~1.00~~	~~1.0~~
~~e_{m2}/e~~	~~0~~	~~0.20~~	~~0.37~~	~~0.52~~	~~0.65~~	~~0.75~~	~~0.84~~	~~0.89~~	~~0.9~~

~~e_{m1} is to be applied where primary supporting members are loaded by uniformly distributed loads or else by not less than 6 equally spaced single loads.~~
~~e_{m2} is to be applied where primary supporting members are loaded by 3 or less single loads.~~
~~Intermediate values may be obtained by direct interpolation.~~
~~ℓ = length of zero-points of bending moment curve:~~
~~$\ell = \ell_0$ for simply supported primary supporting members~~
~~$\ell = 0{,}6\ \ell_0$ for primary supporting members with both ends constraint,~~
~~where ℓ_0 is the unsupported length of the primary supporting member~~
~~e = Width of plating supported, measured from center to center of the adjacent unsupported fields.~~

3.5.~~2~~1 General requirements for FEM calculations

For strength ~~calculations~~ assessments of hatch covers by means of ~~finite elements~~ FE analysis, the hatch cover geometry

shall be idealized as realistically as possible. ~~Element size shall be appropriate to account for effective breadth.~~ In no case element width shall be larger than stiffener spacing. In way of force transfer points~~,~~ and cutouts ~~and one-sided or non-symmetrical flanges~~ the mesh ~~has~~ is to be refined where applicable. The ratio of element length to width shall not exceed ~~4~~3.

The element size along the height of ~~girder~~ webs of primary supporting member ~~shall~~ is not exceed one-third of the web height. Stiffeners, which support~~ing plates against~~ subject to lateral pressure loads, ~~have~~ are to be included in the FE model idealization. Stiffeners may be modeled by using ~~shell~~ beam elements~~,~~ or shell/plane stress elements ~~or beam elements~~. Buckling stiffeners may be disregarded for the stress calculation.

Hatch covers fitted with U-type stiffeners as shown in Figure 15.5 are to be assessed by means of FE analysis. The geometry of the U-type stiffeners is to be accurately modelled using shell/plate elements. Nodal points are to be properly placed on the intersections between the webs of a U-type stiffener and the hatch cover plate, and between the webs and flange of the U-type stiffener.

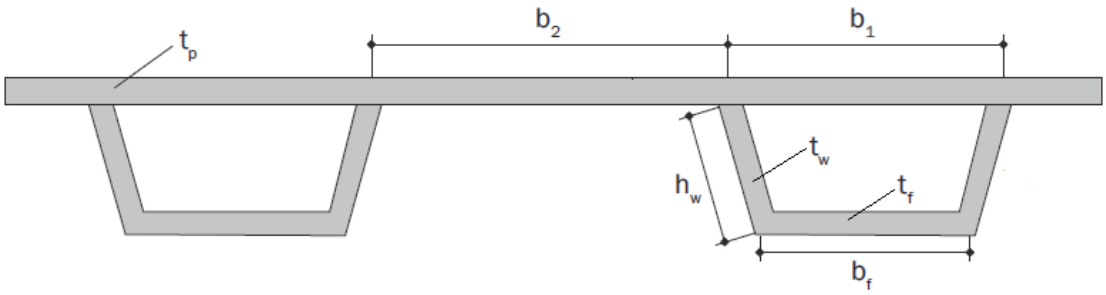

Figure 15.5: Example of hatch cover fitted with U-type stiffeners

Wherever applicable the following boundary conditions are to be applied to the FE model:

- Boundary nodes in way of a bearing pad on the hatch coamings are to be fixed againstdisplacement in the direction perpendicular to the pad
- Lifting stoppers are to be fixed against displacements in the direction determined by the stoppers
- For a folding type hatch cover, the FE nodes connected through a hinge are to have the same translational displacement in the direction perpendicular to the hatch cover top plating.

Existing item B.3.6 was replaced according to UR S21 Rev.6 as below:

3.6 Buckling strength of hatch cover structures

3.6.1 General

Buckling strength of all hatch cover structures is to be checked. Buckling assessments are to be performed in compliance with the requirements in TL-R S35 for the conditions specified in 3.6.2 and 3.6.3.

The net scantlings as defined in 1.5 are to be used for buckling check.

3.6.2 Slenderness requirements

The slenderness requirements are to be in accordance with those specified in TL-R S35/Sec 2. The slenderness requirements need not be applied to the lower boundary of double skin hatch covers unless the cargo hold is designed for carriage of ballast or liquid cargo.

The breadth of the primary supporting member flange is to be not less than 40% of their depth for laterally unsupported spans greater than 3.0 m. Tripping brackets attached to the flange may be considered as a lateral support for primary supporting members.

3.6.3 Buckling requirements

3.6.3.1 Application

These requirements apply to the buckling assessment of hatch cover structures subjected to compressive and shear stresses and lateral pressures. The buckling assessment is to be performed for the following structural elements:

- Stiffened and unstiffened panels, including curved panels and panels stiffened with U-type stiffeners
- Web panels of primary supporting members in way of openings

The buckling strength assessment of coaming parts is to be done according to TL rules.
For rule application, the panel types and assessment methods, the applied lateral pressure and stresses, safety factors and buckling check criteria are defined in 3.6.3.2, 3.6.3.3, 3.6.3.4 and 3.6.3.5, respectively. The procedure and detailed requirements for buckling assessment are given in Section 3 item C.4, including idealization of irregular plate panels, definition of reference stresses and buckling criteria.

Unless otherwise specified, the symbols used in 3.6.3 are defined in Section 3 item C.

3.6.3.2 Panel types and assessment methods

The plate panel of a hatch cover structure is to be modelled as stiffened panel (SP) or unstiffened panel (UP) as defined in Section 3 item C.4, [2]. Assessment Method A (-A) and Method B (-B) as defined in Section 3 item C.1, [3] are to be used in accordance with Tab. 5, Fig. 6 and Fig. 7. For a web panel with opening, the procedure for opening should be used for its buckling assessment.

For a hatch cover fitted with U-type stiffeners, the additional buckling assessment requirements specific for panels with U-type stiffeners in Section 3 item C.5, [2.5] are also to be followed.

Table 15.5. Structural members and assessment methods

Structural elements	Assessment Method (1)(2)	Normal panel definition
Hatch cover top/bottom plating structures, see Figure 15.6		
Hatch cover top/bottom plating	SP-A	Length: between transverse girders Width: between longitudinal girders
Irregularly stiffened panels	UP-B	Plate between local stiffeners/PSM
Hatch cover web panels of primary supporting members, see Figure 15.7		
Web of transverse/longitudinal girder (single skin type)	UP-B	Plate between local stiffeners/face plate/PSM
Web of transverse/longitudinal girder (double skin type)	SP-B**(3)**	Length: between PSM Width: full web depth
Web panel with opening	Procedure for opening	Plate between local stiffeners/face plate/PSM
Irregularly stiffened panels	UP-B	Plate between local stiffeners/face plate/PSM
Note 1: SP and UP stand for stiffened and unstiffened panel respectively. Note 2: A and B stand for Method A and Method B respectively. Note 3: In case that the buckling carlings/brackets are irregularly arranged in the web of transverse/longitudinal girder, UP-B method may be used		

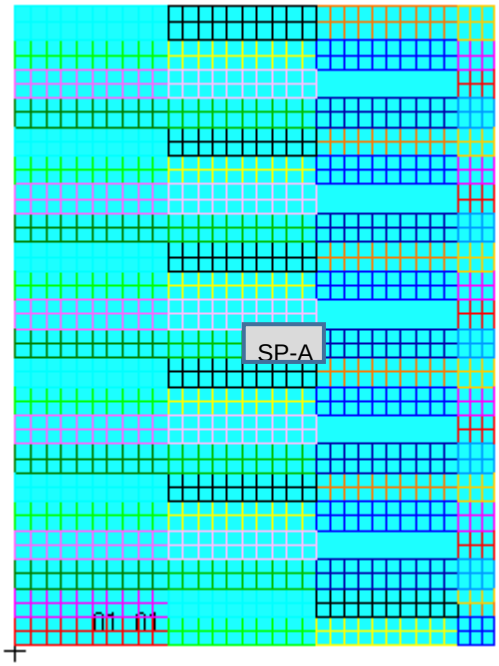

Figure 15.6 Hatch cover top/bottom plating structures

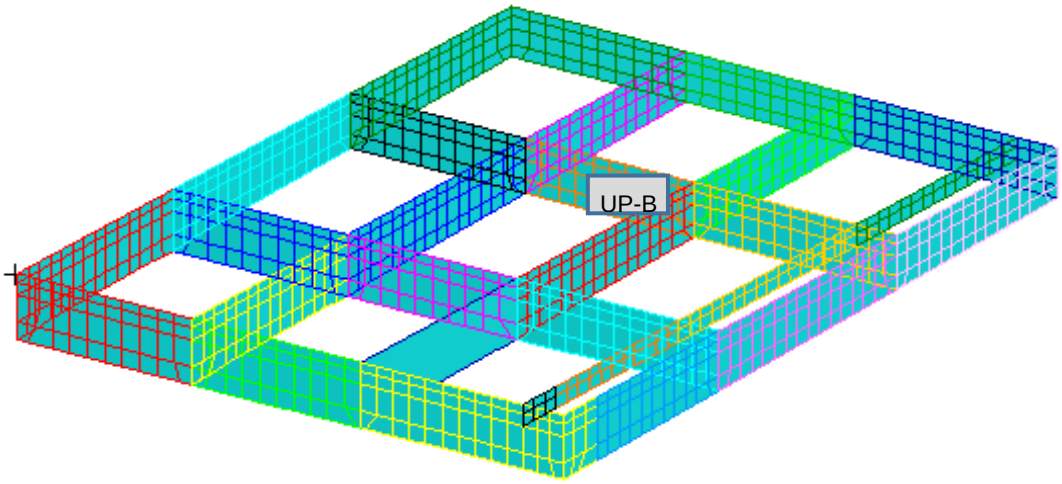

Figure 15.7 Hatch cover webs of primary supporting members

3.6.3.3 Applied lateral pressure and stresses

The buckling assessment of hatch covers is based on the lateral pressure as defined in S2.1 and 2.2, and stresses obtained from FE analysis, refer to 3.5

3.6.3.4 Safety factors

For all hatch cover structural members, safety factor *S*=1.0 is to be applied to both of the plating and stiffener buckling capacity formulas as defined in UR S35/Sec5/2.2 and UR S35/Sec5/2.3, respectively.

3.6.3.5 Buckling acceptance criteria

A structural member is considered to have an acceptable buckling strength if it satisfies the following criterion:

$\eta_{act} \leq \eta_{all}$

where:

η_{act} : Buckling utilisation factor based on the applied stress, as defined in UR S35 /Sec1 [3.2.2] and UR S35/Sec4, and calculated per UR S35/Sec5.

η_{all} : Allowable buckling utilisation factor, taken as given in Table 15.6.

Table 15.6. Allowable buckling utilization factors

Structural component	**Subject to**	*ηall*, Allowable buckling utilisation factor
Plates and stiffeners Web of PSM	External pressure, as defined in 2.1	0,80
	Other loads, as defined in 2.2 to 2.5	0.90 for static+dynamic load case 0.72 for static load case

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.4 was revised according to UR S21 Rev.6 as below:

4. Details of Hatch Covers

4.1 Container foundations on hatch covers

Container foundations are to be designed to the satisfaction of TL. ~~and their~~ The substructures of container foundations are to be designed for cargo and container loads according to 2., applying the permissible stresses according to 3.1.1.

4.2 Weather Tightness

~~For weather deck hatch covers packings are to be provided.~~
Further to the following requirements IACS Rec.. 14 is applicable to hatch covers.

4.2.1 Packing material (general)

The packing material is to be suitable for all expected service conditions of the ship and is to be compatible with the cargoes to be transported. The packing material is to be selected with regard to dimensions and elasticity in such a way that expected deformations can be carried. Forces are to be carried by the steel structure only.

The packings are to be compressed so as to give the necessary tightness effect for all expected operating conditions. Special consideration shall be given to the packing arrangement in ships with large relative movements between hatch covers and coamings or between hatch cover sections. The specification or grade of the packing material is to be indicated on the drawings.

4.2.2 Dispensation of weather tight gaskets

For hatch covers of cargo holds solely for the transport of containers, upon request by the owners and subject to compliance with the following conditions the fitting of weather tight gaskets according to 4.2.1 may be dispensed with:

……

f_b = Minimum required freeboard determined in accordance with ICLL Reg.28 [m] as modified by further regulations as applicable

……

- Labyrinths, gutter bars or equivalents are to be fitted proximate to the edges of each panel in way of the coamings. The clear profile of these openings is to be kept as small as possible.

……

- Furthermore, ~~the requirements for the carriage of dangerous goods are to be complied with, refer to~~ Chapter 3 of IMO MSC/Circ. 1087 is to be referred to concerning the stowage and segregation of containers containing dangerous goods.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.5 was revised according to UR S21 Rev.6 as below:

……

(1) For Type-1 ships:

$$\boldsymbol{t = 0{,}014{,}2 \cdot s \cdot \sqrt{\frac{p_A}{0{,}95 \cdot R_{eH}}} \quad in\ mm}$$

$$t_{min} = 6 + \frac{L_1}{100} \quad \text{in mm}$$

(2) For Type-2 ships:

$$\boldsymbol{t = 0{,}016 \cdot s \cdot \sqrt{\frac{p_{coam}}{0{,}95 \cdot R_{eH}}} \quad in\ mm}$$

t_{min} = 9,5 mm

where:

P_A = pressure, in kN/m^2, as defined in .2.2.1

P_{coam} = pressure, in kN/m^2, as defined in 2.2.2

s = Stiffener spacing [m]

L_1 = L, need not be taken greater than 300 m

In addition, for both Type-1 and Type-2 ships longitudinal strength aspects are to be observed.

……

5.2 Net scantling of ~~secondary~~ stiffeners of coamings

……

(1) For Type-1 ships

$$W = \frac{P_A}{f_{bc}\ R_{eH}} \cdot s \cdot l^2$$

$$A_s = \frac{10^{-2} \cdot s \cdot l \cdot P_A}{R_{eH}}$$

where:

f_{bc} = 12 in general

= 8 for the end spans of stiffeners sniped at the coaming corners

l = ~~Secondary~~ stiffener span [m], to be taken as the spacing of coaming stays

s = Stiffener spacing [m]

Note that for sniped stiffeners of coaming at hatch corners ~~section modulus and~~ shear area at the fixed support have to be increased by 35 %. The gross thickness of the coaming plate at the sniped stiffener end shall not be less than:

$$t = 19,6 \cdot \sqrt{\frac{P_A \cdot s \cdot (l - 0,0005s)}{1000\ R_{eH}}} \quad in\ mm$$

(2) For Type-2 ships:

$$W = 1,21 \frac{P_{Coam}\ s\ l^2}{f_{bc}\ c_p\ R_{eH}}$$

Where:

f_{bc} = 16 in general

= 12 for the end spans of stiffeners sniped at the coaming corners

l = span, in m, of stiffeners

s = spacing, in mm, of stiffeners

P_A = pressure in kN/m^2 as defined in 2.2.1

P_{coam} = pressure in kN/m^2 as defined in 2.2.2

c_p = ratio of the plastic section modulus to the elastic section modulus of the stiffeners with an attached plate breadth, in mm, equal to 40 t, where t is the plate net thickness

= 1.16 in the absence of more precise evaluation

In addition, for both Type-1 and Type-2 ships, horizontal stiffeners on hatch coamings, which are part of the longitudinal hull structure, are to be designed according to TL rules.

5.3 Coaming stays

Coaming stays are to be designed for the loads transmitted through them and permissible stresses according to 3.1.1

5.3.1 Coaming stay section modulus and web thickness

At the connection with deck, the net section modulus W_{net}, in cm^3, and the ~~gross~~ net thickness t_w, in mm, of the coaming stays designed as beams with flange (examples 1 and 2 are shown in Figure 15.~~9~~8) are to be taken not less than:

~~$W_{net} = \frac{526}{\sigma_F} \cdot e \cdot h_s^2 \cdot p_A \quad [cm^3]$~~

~~$t_W = \frac{2}{\sigma_F} \cdot \frac{e \cdot h_s \cdot p_A}{h_W} + t_k \quad [mm]$~~

~~e = Spacing of coaming stays [m]~~

~~h_s = Height of coaming stays [m]~~

~~h_w = Web height of coaming stay at its lower end [m]~~

~~t_k = corrosion addition acc. to 7 [mm].~~

~~For the calculation of W_{net} the effective breadth of the coaming plate shall not be larger than the effective plate width according to 3.6.3.2.~~

~~Face plates may only be included in the calculation if an appropriate substructure is provided and welding ensures an adequate joint.~~

$$W_{net} = \frac{p}{1{,}9\ R_{eH}} s_c \cdot H_c^2 \quad [cm^3]$$

$$t_W = \frac{2}{h.\ R_{eH}} \cdot P\ .\ s_c.\ H_c \quad [mm]$$

Where:

H_C = stay height, in m

s_c = stay spacing, in mm

h = stay depth, in mm, at the connection with the deck

P = pressure on coaming, in kN/m^2, taken as P_A defined in 2.2.1 in general and as P_{coam} defined in 2.2.2 for Type-2 ships.

For other designs of coaming stays, such as those shown in Figure 15.9, examples 3 and 4, the stresses are to be determined through ~~a grillage analysis or~~ FEM. The calculated stresses are to comply with the permissible stresses according to 3.1.1.

Coaming stays are to be supported by appropriate substructures. For calculating the section modulus of coaming stays, their face plate area is to be taken into account only when it is welded with full penetration welds to the deck plating and adequate underdeck structure is fitted to support the stresses transmitted by it.

Webs are to be connected to the deck by fillet welds on both sides with a throat thickness of a = 0.44 t_w.

For Type-2 ships, toes of stay webs ~~within 0.15·h_w the throat thickness is to be increased to a = 0.7·tw for t_w ≤10 mm. For t_w > 10 mm deep~~ are to be connected to the deck plating with full or partial penetration double bevel welds ~~are to be provided in this area~~ extending over a distance not less than 15% of the stay width. For other ship types the size of welding for toes of webs at the lower end of coaming stays should be according to TL Rules.

……

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.6.1 was revised according to UR S21 Rev.6 as below:

6.1 Securing devices

6.1.1 General

Securing devices between cover and coaming and at cross-joints are to be provided to ensure weathertightness. Sufficient packing line pressure is to be maintained. ~~The packing line pressure is to be specified in the drawings.~~

……

Sufficient number of securing devices is to be provided at each side of the hatch cover considering the requirements of 3.4.2. This applies also to hatch covers consisting of several parts.

……

6.1.4 Cross-sectional area of the securing devices

The gross cross-sectional area of the securing devices is not to be less than:

$$A = 0{,}28 \cdot q \cdot s_{SD} \cdot k_\ell \quad [cm^2]$$

Correspondingly, the stiffness of edge girders is to be sufficient to maintain adequate sealing pressure between securing devices. The moment of inertia, in cm^4, of edge girders is not to be less than:

$$I = 6\, q\, S_{SD}^4$$

Where:

q = packing line pressure [N/mm], minimum 5 N/mm

s_{SD} = spacing between securing devices [m], not to be taken less than 2 m

~~$k_\ell = \left[\frac{235}{\sigma_F}\right]^e$~~ $k_l = \left(\frac{235}{R_{eH}}\right)^e$

~~σ_F is not to be taken greater than 0,70 R_m.~~

R_{eH} is the minimum yield strength of the material in N/mm^2, but is not to be taken greater than $0.7R_m$, where R_m is the tensile strength of the material in N/mm^2.

e = 0,75 for ~~σ_F~~ R_{eH} > 235 N/mm^2

= 1,00 for ~~σ_F~~ R_{eH} ≤ 235 N/mm^2

~~R_m = Minimum tensile strength of material in N/mm^2.~~

……

Securing devices of special design in which significant bending or shear stresses occur may be designed according to 6.1.5 As load the packing line pressure q multiplied by the spacing between securing devices S_{SD} is to be applied.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.6.2.2 was revised according to UR S21 Rev.6 as below:

……

~~Where large relative displacements of the supporting surfaces are to be expected, the use of material having low wear and frictional properties is recommended.~~

……

Where:

……

~~= 0,35 for non-metallic, low-friction support materials on steel~~

……

Specifically for Type-2 ships, the following additional requirements are to be complied with:

Hatch covers are to be effectively secured, by means of stoppers, against the transverse forces arising from a pressure of 175 kN/m^2.

With the exclusion of No.1 hatch cover, hatch covers are to be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 175 kN/m^2.

No. 1 hatch cover is to be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 230 kN/m^2.

This pressure may be reduced to 175 kN/m^2 when a forecastle is fitted in accordance with TL-R S28.

The equivalent stress:

i. in stoppers and their supporting structures, and

ii. calculated in the throat of the stopper welds is not to exceed the allowable value of $0.8R_{eH}$.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item B.6.3 was deleted according to UR S21 Rev.6 as below:

~~**6.3 Tightness test, trials**~~

~~6.3.1 The self-tightening steel hatch covers on weather decks and within open superstructures are to be hose tested. The water pressure should not be less than 2 bar and the hose nozzle should be held at a distance of not more than 1,5 m from the hatch cover to be tested. The nozzle diameter should not be less than 12 mm. During frost periods equivalent tightness tests may be carried out to the satisfaction of the Surveyor.~~

~~6.3.2 Upon completion of the hatchway cover system trials for proper functioning are to be carried out in presence of the Surveyor.~~

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Existing item C.2.s was revised according to UR S26 Rev.25 as below:

2.2 Application (1)

For ships on the exposed deck over the forward 0,25 L, applicable to:

- all ship types of sea going ~~ships~~ service of length 80 m or more
- ~~That are contracted for construction on or after 1st January 2004 and~~
- where the height of the exposed deck in way of the hatch is less than 0,1 L or 22 m above the summer load waterline, whichever is the lesser.

This requirement does not apply to small hatches on container ship giving access to a cargo hold which comply with UI LL64 except the requirement of clause 4 & 5. Such hatch covers are considered non-weathertight regardless of whether it is actually weathertight or not. However, for scantlings of small hatches, the strength requirements in clause 4 of this requirement could be applied instead of clause 6 of UI LL64.

06. Section 16 – Hull Outfitting

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.2.1.1 was added as below:

2.1.1 For ships engaged in cabotage service (assigned with K50, K20, K6, L1 and L2), glass panes of windows can be glued to the framing or hull. However, this is not allowed for side scuttles.

07. Section 17 – Equipment

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items A.2.7, 2.8, 2.9 and 2.10 were added according to UR A1 Rev.8 as below:

2.7 In addition to planned anchoring for normal operations, anchoring equipment is also important for ship safety in emergency situations such as loss of manoeuvrability, unscheduled repairs and other unexpected situations.

2.8 The anchoring equipment required herewith applies to self-propelled vessels over 100 GT, except for:

(a) Inland navigation vessels,
(b) Military vessels,
(c) Government ships operated for non-commercial pırposes,
(d) High speed and light crafts,
(e) Yachts.

2.9 The anchoring equipment required herewith applies to vessels with unrestricted service.

2.10 Unrestricted service means a vessel engaged on international voyages and not bounded by any limitations on operating environment reflected in vessel class notation.

Revision Date: March 2024

Entry into Force Date: 1 July 2024

Item B.2 was added according to UR A1 Rev.8 as below:

2. For ships of length less than 90 m, alternative methodology using direct force calculation for anchoring equipment described in appendix B of IACS Rec. 10 may be used.

Revision Date: March 2024

Entry into Force Date: 1 July 2024

Item D.4 was added according to UR A1 Rev.8 as below:

4. Steel Wire Rope for Anchors

~~Steel wire rope instead of stud link chain cable may be accepted for vessels with length less than 40 m., for vessels of special design or operation and for vessels with restricted services. The acceptance will be based on a case-by –case evaluation, including consideration of operational and safety aspects. If steel wire rope is accepted, the following to be fulfilled:~~

~~- The steel wire rope shall have at least the same breaking strength as the stud link chain cable,~~

~~- A length of chain cable shall be fitted between the anchor and the steel wire rope. The length is to be taken as the smaller of 12.5 m. and the distance between the anchor in stowed position and the winch,~~

~~- The anchor weight is to be increased by 25%,~~

~~- The length of the steel wire rope is to be at least 50% above the values given in the Table 17.1 for the chain cable.~~

~~- All surfaces being in contact with the wire need to be rounded with a radius of not less than 10 times the wire rope diameter (including stem).~~

4.1 Wire rope may be used in place of chain cable on ships:

(a) with less than 90 m in length and which will need an anchor for emergency purposes, i.e., not intended to use their anchor in normal temporary anchoring operation, or

(b) with the anchoring equipment used for positioning with a minimum of 4 points anchoring, e.g., for cable or pipe laying.

4.2 Use of wire rope is subject to the following conditions:

(a) The length of the wire rope is to be equal to 1.5 times the corresponding tabular length of chain cable (col. 5 of Table 17.1) and their strength is to be equal to that of chain cable of Grade K1 (Item 5)

(b) The anchor weight shall be increased by 25 % compared to anchor associated with chain cable according to Table 17.1.

(c) A short length of chain cable is to be fitted between the wire rope and anchor having a length of 12.5 m or the distance between anchor in stowed position and winch, whichever is less.

(d) All surfaces being in contact with the wire need to be rounded with a radius of not less than 10 times the wire rope diameter (including stem).

(e) Steel wire shall be selected to fit for purpose based on the manufacturer recommendation and shall be provided with guidance for maintenance and inspection.

4.3 For restricted services the use of steel wire rope may be accepted in place of chain cable at the discretion of **TL**.

Revision Date: March 2024

Entry into Force Date: 1 July 2024

Item F.1.4 was revised according to Rec. 10 Rev.5 as below:

The value of line design break force (LDBF) is declared by the manufacturer on each line's mooring line certificate and is stated on a manufacturer's line data sheet. LDBF of a line should be 100%-105% of the ship design minimum breaking load defined in 3.1.

The LDBF for nylon (polyamide) mooring lines should be specified as break tested wet, because nylon lines change strength characteristics once exposed to water and generally do not fully dry to their original construction state.

Item F.2.2 was deleted and subsequent item were renumubered according to Rec. 10 Rev.5 below:

~~**2.2** Notwithstanding the strength requirements given in Table 17.1, no fibre rope is to be less than 20 mm diameter~~.

Table 17.2 was revised as below:

Table 17.2 Equipment reduction for restricted service

Restriction of voyage	Stockless bower anchors		Stud-Link chain cables	
	Number	Mass change per anchor	Length reduction	Diameter reduction
3 nm from the coast line (Class D), L1 and L2~~)~~	2	-%30	-%20	-%10
6 nm from the coast line (Class C), **K6**~~)~~	2	-%30	-%20	-%10
20 nm from the coast line (Class B), **K20**~~)~~	2	-%20	-	--
Alternatively				
3 nm from the coast line (Class D), L1 and L2~~)~~	1	-	-%50	-
6 nm from the coast line (Class C), **K6**~~)~~	1	-	-%50	-
20 nm from the coast line (Class B), **K20**~~)~~	1	+%40	-%40	-

08. Section 18 – Rudder and Manoeuvring Arrangement

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items A.1.3 and 2.3 were revised according to UR S10 Rev.7 as below:

1.3 This Section applies to ordinary profile rudders, and to some enhanced profile rudders with special arrangements for increasing the rudder force
This Section applies to rudders made of steel for ships with L≥ 24 m

2.3 The rudder stock is to be carried through the hull either enclosed in a watertight trunk, or glands are to be fitted above the deepest load waterline, to prevent water from entering the steering gear compartment and the lubricant from being washed away from the rudder carrier. If the top of the rudder trunk is below the ~~deepest~~ waterline at scantling draught (without trim) two separate watertight seals/stuffing boxes are to be provided.

Item A.5.3 was revised according to UR S10 Rev.7 as below:

5.3 Welds in the rudder side plating subjected to significant stresses from rudder bending and welds between plates and heavy pieces (solid parts in forged or cast steel or very thick plating) are to be made as full penetration welds. In way of highly stressed areas e.g. cut-out of semi-spade rudder and upper part of spade rudder, cast or welding on ribs is to be arranged. Two sided full penetration welding is normally to be arranged. Where back welding is impossible welding is to be performed against ceramic backing bars or equivalent. Steel backing bars may be used and are to be fitted with continuous~~ly~~ welded~~ed~~ on one side to the ~~heavy piece~~ bevelled edge, see Figure 18.1a. The bevel angle is to be at least 15° for one sided welding.

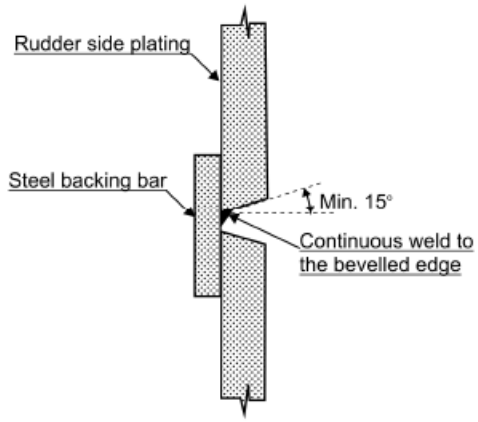

Figure 18.1: Use of steel backing bar in way of full penetration welding of rudder side plating

Item A.7 was revised according to UR S10 Rev.7 as below:

……

v_a = Astern speed of ship [kn] as defined in SOLAS II-1/3.15; however in no case taken less than $0.5 \cdot v_0$. For ships strengthened for navigation in ice, refer to Section 14, D.9.

……

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.2.1 was revised according to UR S10 Rev.7 as below:

……

For a spade rudder with trunk extending inside the rudder, the rudder stock scantlings shall be checked against the two cases defined in E.1.1 and 1.2.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.3.2.2 was revised according to UR S10 Rev.7 as below:

……

The maximum moment, M_C, in top of the cone coupling as shown in Figure 18.4 is applicable for the connection between the rudder and the rudder stock.

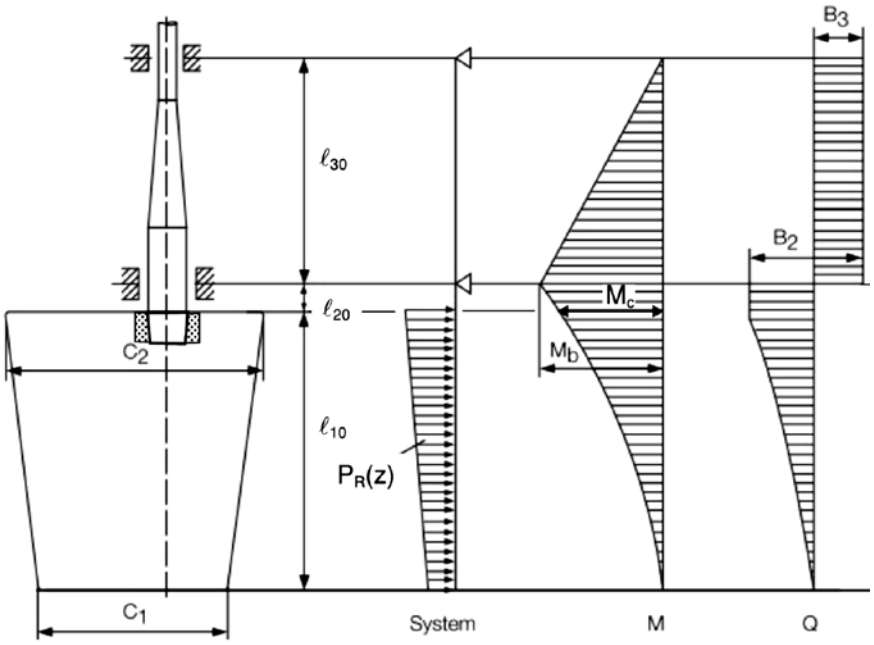

Figure 18.4 Load, Bending Moment and Shear Force Distribution on a Spade Rudder

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.3.3.2 was revised according to UR S10 Rev.7 as below:

3.3.2 Moments and Forces

For a spade rudder with trunk extending inside the rudder, the strength shall be checked against the following two cases:

a) pressure applied on the entire rudder area
b) pressure applied only on rudder area below the middle of neck bearing.

~~For spade rudders with rudders trunks~~ The moments~~, in Nm,~~ and forces~~, in N,~~ for the two cases defined above is to be determined ~~by the following formulae~~ according to Figure 18.5 a) and b), respectively. ~~M_R is the greatest of the following values:~~

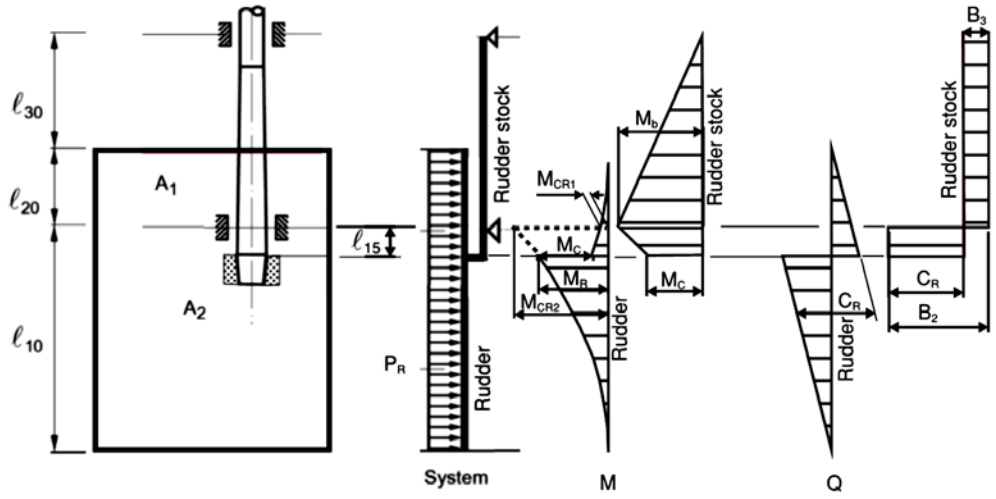

Figure 18.5 a)

Full rudder force $C_R = C_{R1}+C_{R2}$ and total rudder torque $Q_R = Q_{R1} + Q_{R2}$ with rudders stock bending moment $M_b = M_{CR2} - M_{CR1}$

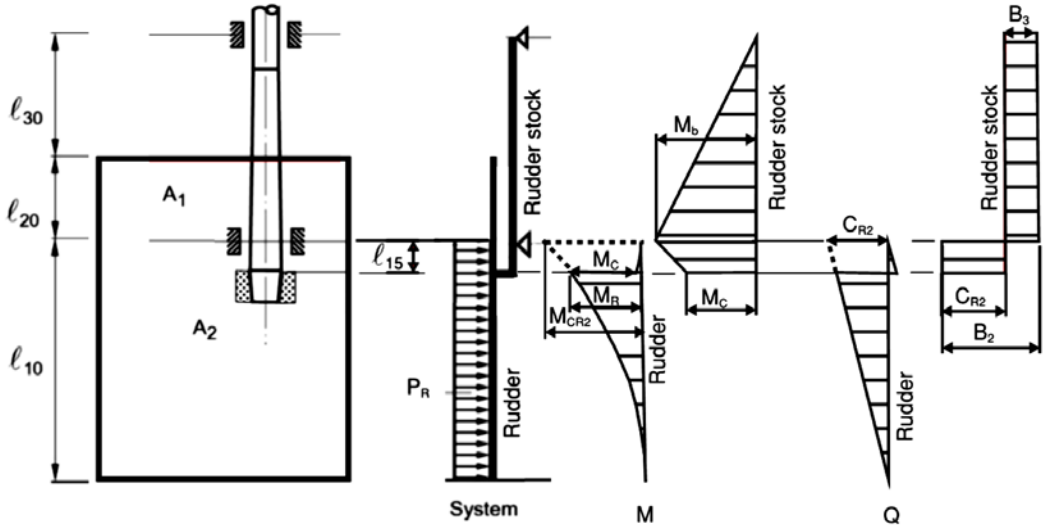

Figure 18.5 b)

Rudder force C_{R2} corresponding to rudder torque Q_{R2} acting at rudder blade area A_2 with rudders stock bending moment $M_b = M_{CR2}$

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.4.1.3 was revised according to UR S10 Rev.7 as below:

4.1.3 For rudder trunks extending below shell or skeg, the fillet shoulder radius r, in mm (refer to Figure 18.9) is to be as large as practicable and to comply with the following formulae:

$r = 0.1d_c/k$

……

k = material factor for the rudder trunk as given in Section 3 A.2.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item D.3.1.1 was revised according to UR S10 Rev.7 as below:

d_0, d_u = Diameters in mm, refer to Figure 18.10

ℓ_c = Cone length in mm, refer to Figure 18.11b,

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item D.3.2.3.1 was revised according to UR S10 Rev.7 as below:

M_c = Bending moment in rudder stock at the top of the cone coupling (e.g. case of spade rudders) [Nm].

For spade rudder with trunk extending inside the rudder, the coupling shall be checked against the two cases defined in E.1.1 and 1.2.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item E.2.1 was revised according to UR S10 Rev.7 as below:

$t = 5.5 \cdot f_2 \cdot a \cdot \sqrt{k}\sqrt{T + C_R \cdot 10^{-4}/A} + 2.5$ [mm]

……

T = Scantling draught, in m.

f_2 = Coefficient of aspect ratio of the plate panel, equal to:

$= \sqrt{1.1 - 0.5\left(\frac{s}{\ell}\right)^2}$, to be taken not greater than 1.0

Item E.5.1 was revised according to UR S10 Rev.7 as below:

5.1 In way of bearings liners and bushes are to be fitted. For rudder stocks and pintles having diameter less than 200 mm, liners in way of bushes may be provided optionally. Their minimum thickness is:

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item E.6.4 was revised according to UR S10 Rev.7 as below:

6.4 The required push-up pressure for pintle in case of dry fitting, in N/mm², is to be determined by p_{req1} as given below.

The required push-up pressure p_{req} for pintle ~~bearings~~ in case of oil injection fitting is to be determined by the ~~following formula~~ maximum pressure of p_{req1} and p_{req2} as given below:

$$P_{req1} = 0.4 \cdot \frac{B \cdot d_o}{{d_m}^2 \cdot \ell} \quad N/mm^2$$

$$P_{req2} = 6 \cdot \frac{M_{bp} \cdot 10^3}{d_m \cdot \ell^2} \quad N/mm^2$$

B = Support force in the pintle, in N, e.g. B_1 for semi-spade rudder ~~horn~~ according to 5.3

d_0 = Pintle diameter [mm] according to Figure 18.16

d_m = Mean cone diameter [mm]

ℓ = Cone length [mm]

M_{bp} = bending moment in the pintle cone coupling to be determined by:

M_{bp} = $B\ell_a$ [Nm]

ℓ_a = length between middle of pintle-bearing and top of contact surface between cone coupling and pintle in m, see Figure 18.16)

The required push-up length is to be calculated similarly as in D.3.2.3.2 using the required push-up pressure as defined above, and properties for the pintle bearing.

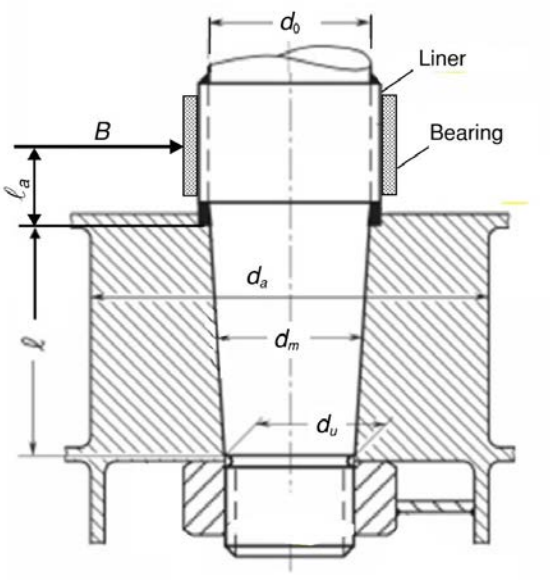

Figure 18.16 Pintle cone coupling indicating ℓ_a

09. Section 21 – Structural Fire Protection

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Footnote 2 and 16 were revised according to UI SC264 Corr.1 as below:

---

(2) *With respect ~~only~~ to 12.1, a ventilation duct made of material other than steel may be considered equivalent to a ventilation duct made of steel, provided the material is non-combustible and has passed a standard fire test in accordance with Annex 1: Part 3 of the FTP Code as non-load bearing structure for 30 minutes following the requirements for testing "B" class divisions.*

10. Section 29 – Tugs

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item E.1 was revised according to UR A1 Rev.8 as below:

For tugs under 45 m in length intended for towing service only, one anchor may be used onboard provided that the second anchor and its relevant chain cable holds readily available to be installed. In case of loss of anchor, the tug is to remain in port until replace anchor equipment is installed onboard.

11. Section 30 – Passenger Ships

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.1.4 was revised according to UI SC299 New as below:

1.4 Lead or other heat sensitive materials are not to be used in systems which penetrate watertight boundaries, where deterioration of such systems in the event of fire would impair the watertight integrity of the boundaries. See also IACS UI SC299 and The Explanatory Notes to SOLAS Regulation II-1/13.2.3 (as contained in resolution MSC.429(98)/Rev.2)

12. Section 34 – Dredgers

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item G.1 was revised according to UR A1 Rev.8 as below:

Dredgers with unusual design of the underwater part of the hull are not covered by alternative methodology using direct force calculation for anchoring equipment described in appendix B of IACS Rec. 10.

13. Section 35 – Floating Docks

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.2 was revised as below:

2. Class Notation

Vessels built in accordance with the requirements of this Section are to be assigned the class notation **"FLOATING DOCK".** Notation indicating the lifting capacity in [t] and port of operation also will be shown in the record.
e.g. FLOATING DOCK (TUZLA Port) Lifting capacity 10000 t

Item A.3 was revised as below:

3. Documentation

.....

- Plans of fire protection, fire detection and alarm and extinguishing systems,

.....

H. Electric

Dry docks in all normal operation conditions are to be provided with at least two sources of electric power (e.g. onshore, on board, or in combination).

If the source of power is only provided by onshore, a self-contained emergency source of power is to operate automatically on failure of supply and is to have sufficient capacity to provide emergency lighting, alarms, and communication for a period of time. The period is to be submitted at design stage and it is to be taken as at least as two hours.

PART A – CHAPTER 2 - MATERIAL

01. Section 03 – Rolled Steel Plates, Sections and Bars

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Note 6 of table 3.27 was revised according to UR W31 Rev.3 as below:

*6. Where small-scale ~~alternative~~ tests are used for product testing (batch release testing), these test methods are to be approved by **TL** in accordance with Annex 5 of this section.*.

Item 1.4.2.2 was revised according to UR W31 Rev.3 as below:

For TL- EH47 steels with brittle crack arrest properties, HV10, as defined in Chapter 3 Welding Section 12.F, is to be not more than 380~~. Measurement~~ and measurement points are to include mid-thickness position in addition to the points required by Chapter 3 Welding Section 12.F.

Numbering of Annexes was totally revised and references to items of the annexes were revised accordingly, according to UR W31 Rev.3.

Renumbered item A2.2.1.2 was added and item A2.2.2.2 (a) was revised of Annex 2 according to UR W31 Rev.3 as below:

A2.2.1.2 The products for testing are to represent the maximum thickness for approval. If the target chemical composition changes with the thickness, the maximum thickness for each specified chemical composition specification shall be tested.

.....

The test method is to be in accordance with recognized national standards such as ~~JIS Z 3158-2016 or GB/T 4364-2013~~ ISO 17642-2-2005. Acceptance criteria are to be in accordance with **TL**'s practice.

Renumbered items A3.3.1, A3.3.2.2, A3.3.3.4 and Note of Annex 3 was revised according to UR W31 Rev.3 as below:

.....

If the manufacturing process and mechanism to ensure the brittle crack arrest properties for the steels intended for approval are same, 3.1, Appendix A2 of TL- R W11 is to be followed for the extent of the approval tests. For TL-EH47 steels with brittle crack arrest properties, 3.1 (c) and (d), Appendix A2 of TL-R W11 are not applied.

A3.3.1.2 The products for testing are to represent the maximum thickness for approval. If the target chemical composition changes with the thickness, the maximum thickness for each specified chemical composition specification shall be tested.

.....

A3.3.2.2 In the case of applying for addition of the specified brittle crack arrest properties for TL- EH36, TL-EH40 and TL- EH47 steels of which, manufacturing process has been approved by **TL** (i.e. The aim analyses~~,~~ and method of manufacture ~~and condition of supply~~ are similar and the steelmaking process, deoxidation and fine grain practice, casting method and condition of supply are the same), brittle crack arrest tests, chemical analyses, tensile test and Charpy V-notch impact test are to be carried out in accordance with Annex 3 of this section and Appendix A2 of TL-R W11.

.....

A3.3.3.4 The test specimens and repeat test specimens are to be taken from the same steel plate. Where the brittle crack arrest properties are evaluated by Kca, and the brittle crack arrest test result fails to meet the requirement, further brittle crack arrest tests may be carried out. In this case, the judgment of acceptance is to be made on the arrest toughness value Kca of all test specimens (results of the initial test, failed tests and additional tests shall be included in the testing report.).

.....

Note: *Chemical composition, mechanical properties, brittle crack arrest properties (e.g. brittle crack arrest test results or small-scale ~~alternative~~ test results) and nominal thickness are to be described in the form of histogram or statistics.*

Content of Annex 4 was deleted except Scope and Method and Evaluation of Annex 4 Appendix A according to UR W31 Rev.3 and remaining part revised as below:

A4.1. Scope

ISO20064: 2019 provides a test method for the determination of brittle crack arrest toughness of steel by using wide plates with a temperature gradient.

This Annex 4 specifies the test ~~method~~ procedures for brittle crack arrest toughness (i.e. *Kca*) of steel using fracture mechanics parameter and determination method of Kca at a specific temperature which are specified in ISO 20064:2019. Additionally, this Annex 4 specifies the evaluation method of Kca of test plate. This Annex 4 is applicable to hull structural steels with the thickness over 50 mm and not greater than 100 mm specified in TL- R W11 or this section.

A4.2 Test Procedures

The test procedures including testing equipment, test specimens, test methods, determination of arrest toughness, reporting of test results, etc. are to be in accordance with ISO 20064: 2019.

As a method for initiating a brittle crack a secondary loading mechanism can be used in accordance with Annex D of ISO 20064: 2019, except that the first sentence in Annex B.2.4 of ISO 20064: 2019 is revised to {Kca /[K0 *exp(−c/TcaK)]} for each data point".

A4.3 Determination of K_{ca} at a Specific Temperature and the Evaluation

A4.3.1 Method

The method for conducting multiple tests to obtain K_{ca} value at a specific temperature is to be in accordance with Annex B of ISO 20064:2019.

A4.3.2 Evaluation

.....

References to Annex 4 on Annex 5 was replaced by ISO 20064:2019 and renumbered items A5.4.4.4 and A5.4.5.1 were revised according to UR W31 Rev.3 as below:

A5.4.4.4 The length of side groove, L_{SG} shall be no shorter than the sum of the required embrittled zone length ~~of 150 mm~~.

A5.4.5.1 The length of embrittled zone shall be ~~nominally equal to 1~~ at least 150 mm ~~in both systems of EBW and LTG~~.

A5.5.2.4.6 ~~Two t~~ Temperature measurements at A_2, B_2 and A_3, B_3 shall be satisfied the following requirements:

Annex 6 “Approval Scheme of Small-scale Test Methods for Brittle Crack Arrest Steels” was added according to UR W31 Rev.3.

PART A – CHAPTER 3 - WELDING

01. Section 03 – Welding of Hull Structures

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Table 3.12 was revised as below:

Table 12.3 Test piece thickness

Test piece thickness (1), (2) t [mm]	**Qualification Range [mm] ~~Range of Application~~ (4) (5) (6)**	
	Butt and T-joint welds with single run or single run from both sides ~~Single-run welding (single bead) and welding in one run on each side (Two-run technique)~~	**Butt and T-joint welds with multi-run and fillet welds ~~Multi-run technique~~ (3)**
t ≤ 3	0,7 t - 1,3 t	0,7t - 2 t
3 < t ≤12	0,7 t - 1,1 t **~~(7)~~**	3 mm. - 2 t
12< t ≤100	0,7 t - 1,1 t **(7)**	0,5t - 2 t, (max. 150 mm)
t > 100	Not Applicable	50 mm - 1,5 t

(1) *If special cooling conditions have to be complied with or particular weld shapes are prescribed, they shall be taken into account when selecting the test piece thickness.*

(2) *For multi process procedures, the recorded thickness contribution of each process is to be used as a basis for the range of approval for the individual welding process.*

(3) *For fillet welds, the range of approval is to be applied to both base metals.*

(4) *For unequal plate thicknesses the following applies:*

For butt welds, the ~~average of the two plate thicknesses in the weld area~~ ~ weld lower thickness is the ruling dimension. For fillet weld joints, the test piece thickness thickness range shall be applied to both parent materials independently. ~~lower limit of the range of application of 0,8 times the smaller test piece thickness t1 (e.g. web thickness) and the upper limit of 1,1 times the larger test piece thickness t2 (e.g. flange thickness) is the ruling dimension, but the ratio of plate thicknesses t2 to t1 shall not exceed 3.~~

(Example: If t1 is 10 mm and t2 is 20 mm, the test piece thickness range for t1 is 3 mm to 20 mm, for t2 is 10 mm to 40 mm)

(5) *For the vertical-down welding, the test piece thickness t is always taken as the upper limit of the range of application.*

(6) *Notwithstanding the above, the approval of maximum thickness of base metal for any technique is to be restricted to the thickness of test assembly if three of the hardness values in the heat affected zone are found to be within 25 HV of the maximum permitted, as stated 4.1.5 ~~(2) and (3)~~.*

(7) *For high heat input processes over 50kJ/cm, the upper limit of range of approval is to be 1.0 x t.*

PART B – CHAPTER 4 - MACHINERY

01. Section 2 – Internal Combustion Engines and Air Compressors

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item column was added to Table 2.6.B and footnote 2 was revised according to UR M72 Rev.3 as below:

Table 2.6.B Summary of required documentation for engine components

Item	Part (4), (5), (6), (7), (8)	Material properties (1)	Non-destructive Examination (2)	Hydraulic testing (3)	Dimensional inspection, including surface condition	Visual inspection (Surveyor)	Applicable to engines	Component certificate
	Notes : **(1)** *Material properties include chemical composition and mechanical properties, and also surface treatment such as surface hardening (hardness, depth and extent), peening and rolling (extent and applied force).* **(2)***Non-destructive examination means e.g. ultrasonic testing, crack detection by MPI or DP. When certain NDE method on the finished component is impractical (for example UT for items 12/13), the NDE method can be performed at earlier appropriate stages in the production of the component, see E.2.1.2.* **(3)** *Hydraulic testing is applied on the water/oil side of the component. Items are to be tested by hydraulic pressure at the pressure equal to 1.5 times the maximum working pressure. High pressure parts of the fuel injection system are to be tested by hydraulic pressure at the pressure equal to 1.5 maximum working pressure or maximum working pressure plus 300 bar, whichever is the less. Where design or testing features may require modification of these test requirements, special consideration may be given.* **(4)** *Material certification requirements for pumps and piping components are dependent on the operating pressure and temperature. Requirements given in this Table apply except where alternative requirements are explicitly given in Sections 14 and 16.* **(5)***For turbochargers, see Section 3.* **(6)** *Crankcase explosion relief valves are to be type tested..* **(7)** *Oil mist detection systems are to be type tested.* **(8)** *For speed governor and overspeed protective devices, see F.* **(9)** *Charge air coolers need only be tested on the water side.* **(10)** *Hydraulic testing is also required for those parts filled with cooling water and having the function of containing the water which is in contact with the cylinder or cylinder liner.*							

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item N.8.3.1.3 was added according to UR M82 New as below:

8.3.1.3 For type testing procedure of explosion relief devices for combustion air inlet and exhaust gas manifolds of internal combustion engines using gas as fuel see IACS UR M82.

02. Appendix IV – Guidance for Evaluations of Fatigue Tests

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item D.3 was revised according to UR M53 Rev.5 as below:

~~Related to~~At the crankpin ~~diameter~~fillet:

~~$$Q = \left(\sqrt{\left(\frac{\sigma_{BH}}{\sigma_{DWCT}} \right)^2 + \left(\frac{\tau_{BH}}{\tau_{DWCT}} \right)^2} \right)^{-1}$$~~

$$Q = \left(\sqrt{\left(\frac{\sigma_{BH} + \sigma_{add}}{\sigma_{DWCT}} \right)^2 + \left(\frac{\tau_H}{\tau_{DWCT}} \right)^2} \right)^{-1}$$

where:

σ_{DWCT} fatigue strength by bending testing

τ_{DWCT} fatigue strength by torsion testing

For other parameters see Section 2 items D.2.1.3, D.2.2.3 and D.4.

Related to crankpin oil bore:

$$Q = \frac{\sigma_{DWOT}}{\sigma_v};$$

$$\sigma_v = \frac{1}{3} \cdot \sigma_{BO} \cdot \left[1 + 2 \cdot \sqrt{1 + \frac{9}{4} \cdot \left(\frac{\sigma_{TO}}{\sigma_{BO}} \right)^2} \right]$$

where:

σ_{DWOT} fatigue strength by means of largest principal stress from torsion testing

~~Related to~~At the journal ~~diameter~~fillet:

~~$$Q = \left(\sqrt{\left(\frac{\sigma_{BG}}{\sigma_{DWJT}} \right)^2 + \left(\frac{\tau_G}{\tau_{DWJT}} \right)^2} \right)^{-1}$$~~

$$Q = \left(\sqrt{\left(\frac{\sigma_{BG} + \sigma_{add}}{\sigma_{DWJT}} \right)^2 + \left(\frac{\tau_G}{\tau_{DWJT}} \right)^2} \right)^{-1}$$

where:

σ_{DWJT} fatigue strength by bending testing

τ_{DWJT} fatigue strength by torsion testing

For other parameters see Section 2 items D.2.1.3, D.2.2.3 and D.4.

In case increase in fatigue strength due to the surface treatment is considered to be similar between the above cases, it is sufficient to test only the most critical location according to the calculation where the surface treatment had not been taken into account.

03. Section 4 – Turbomachinery / Gas Turbines and Exhaust Gas Turbochargers

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item numbers edited and items A.3.1, A.4.2, A.4.4, C.2, C.4.3 and D.3.3 were revised according to UR M73 Rev.2 as below:

- Documentation* of safe torque transmission when the disc is connected to the shaft by an interference fit, see C.3~~2.4~~.

……

4.2 For category C, this shall be verified by means of periodic product audits of an Alternative Certification Scheme (ACS; see Classification and Surveys, Section 2, item F) by **TL**.

……

4.4 Turbochargers shall be delivered with:

• For category C, a society certificate, which ~~at~~ as a minimum cites the applicable type approval and the ACS, when ACS applies.

• For category B, a work's certificate, which ~~at~~ as a minimum cites the applicable type approval, which includes production assessment.

……

2.2 For category B and C, containment shall be documented by testing.

……

The following requirements in item 2.3 and 2.4 are applicable for a type approval of turbochargers.

2.3 The minimum speeds for the containment test are defined as follows:

……

2.4 The containment test has to be performed at ~~working temperature~~ a temperature which is not lower than the maximum allowable temperature of the turbocharger to be specified by the manufacturer. The theoretical (design) natural burst speeds of compressor and turbine have to be submitted for information.

2.5 Manufacturers are to determine whether cases more critical than those defined in items 2.3 and 2.4 exist with respect to containment safety. Where such a case is identified, evidence of containment safety shall also be provided for that case.

2.2~~5~~6 A numerical proof such as Finite Element Method (FEM) of sufficient containment integrity of the casing based on calculations by means of a simulation model may be accepted provided that:

……

- The design of the turbocharger regarding the geometry and kinematics is to be similar to ~~that of one~~ the turbocharger that was used for the reference ~~which has passed the~~ containment test. ~~In general totally new designs will call for new containment tests,~~

……

2.7 In cases where a totally new design*** is adopted for a turbocharger for which an application for type approval certification has been requested, new reference containment tests are to be performed.

*** Totally new design means the principal differences between a new turbocharger and previous ones are related to geometry and kinematics. The turbochargers are to be regarded as having a totally new design if the structure and/or material of the turbocharger casings are changed, or any of, but not limited to, the following items is changed from the previous design.

- Maximum permissible exhaust gas temperature
- Number of bearings
- Number of turbine blades
- Number of turbine wheels and/or compressor wheels
- Direction of inlet air and/or exhaust gas (e.g., axial flow orientation, radial flow orientation)
- Type of the turbocharger drive (e.g., axial turbine type, radial turbine type, mixed flow turbine type)

2.~~3~~8 In general a **TL** Surveyor must be involved for the containment test.

~~2.4~~ 3. Disc-shaft shrinkage fit

~~2.4~~3.1 Applicable to Category C

~~2.4~~3.2 In cases where the disc is connected to the shaft with interference fit, calculations shall substantiate safe torque transmission during all relevant operating conditions such as maximum speed, maximum torque and maximum temperature gradient combined with minimum shrinkage amount.

~~3~~4. Type Testing

~~3~~4.1 Applicable to Categories B and C

~~3~~4.2 The type test for a generic range of turbochargers may be carried out either on an engine (for which the turbocharger is foreseen) or in a test rig.

~~3~~4.3 Turbochargers for the low, medium, and high-speed engines are to be subjected to at least 500 load cycles at the limits of operation. This test may be waived if the turbocharger together with the engine is subjected to this kind of low cycle testing, see Section 2, E.3.

~~3~~4.4 The suitability of the turbocharger for such kind of operation is to be preliminarily stated by the manufacturer.

~~3~~4.5 The rotor vibration characteristics shall be measured and recorded in order to identify possible sub-synchronous vibrations and resonances.

~~3~~4.6 The type test shall be completed by a hot running test at maximum permissible speed combined with maximum permissible temperature for at least one hour.

……

~~3~~4.7 The extent of the surveyor's presence during the various parts of the type tests is left to the discretion of **TL**.

4~~5~~. Spare Parts

The rotating assembly parts (rotor, wheels and blades) as well as turbocharger casings have to be replaced by spare parts which are manufactured by TL approved manufacturers according to the previously approved drawings and material specifications. The manufacturer must be recognized by the holder of the original type approval.

……

3.3 Upon satisfactory assessment in combination with a bench test carried out on a sample basis with **TL** Surveyor's attendance, the tests according to C.2 and C.~~3~~4 are not required. ~~The scope of the testing for materials and components has to be fulfilled unchanged according to C.1 and C.2~~.

04. Section 16 – Internal Combustion Engines and Air Compressors

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.1 was revised according to REC 177 New as below:

A. General

1. Scope

……

For shipbuilding and remedial quality standard for machinery piping systems, refer to IACS REC 177.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item G.10 was revised according to UI SC123 Rev.5 as below:

10.3 For "one fuel ship", where main and auxiliary engines and boiler(s) are operated with Heavy Fuel Oil (HFO), the arrangements complying with this regulation or acceptable "equivalent arrangements" shall be provided.

……

Acceptable "equivalent arrangements"**(15)** shall comprise at least:

……

10.4 Where main engines and auxiliary boiler(s) are operated with Heavy Fuel Oil (HFO) and auxiliary engines are operating with Marine Diesel Oil (MDO), the arrangements complying with this regulation or acceptable "equivalent arrangements" shall be provided.

……

Acceptable "equivalent arrangements"**(15)** shall comprise at least:

……

(15) *Any fuel oil which requires post service tank heating to achieve the required injection viscosity is not regarded in this context as MDO.*

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item G.11.2.2 and G.12.3 were revised according to REC 151 Rev.2 as below:

11.2.2 Heavy fuel oil cleaning for diesel engines

For cleaning of heavy fuels, purifiers or purifiers combined with automatic filters are to be provided.
For recommendation for fuel oil treatment systems refer to ~~Guideline TL-G~~ IACS REC 151.

……

12.3 Sampling points should be provided at locations within the fuel oil system that enable samples of fuel oil to be taken in a safe manner for 'in-use' and means to obtain 'onboard samples'.

05. Section 17 – Spare Parts

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Section 17 was generally revised according to REC 26 Rev.2, REC 27 Rev.2, REC 28 Rev.2, REC 29 Rev.2 and REC 30 Rev.2.

PART B – CHAPTER 5 - ELECTRICAL INSTALLATION

01. Section 01 – General Requirements and Instructions

Revision Date: May 2024

Entry into Force Date: 1 July 2024

New item L was added according to UR E26 & E27 New & Rev.1 as below:

L. Cyber Resilience

For cyber resilience of ships and cyber resilience of on-board systems and equipment, refer to TL rules, Additional Rules for Cyber Resilience.

02. Section 05 – Low Voltage Switchgear Assemblies

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.1.12 was added as below:

1.12 Switchboards of electrical power generation plants, main group switchboards and other switchboards with more than 1 control section or 5 total indication lamps, starter panels with more than 3 lamps or starter panel cabinet which contains more than one control section (i.e. 2 pumps etc.) shall have lamp test option. Switchboards with HMI (Human Machine Interface) panels with visual and audible alarm functionality may be exempt from the lamp test option**.**

03. Section 10 – Computer Systems

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Section 10 was totally revised according to UR E22 Rev.3.

04. Section 18 – Additional Rules for Bulk Carriers and Single and Multiple Hold Cargo Ships Other Than Bulk Carriers

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item B.5.1 was revised according to UR E10 Rev.9 as below:

5. Tests

5.1 Type test

5.1.1 Water level detector systems should be type tested to demonstrate their robustness and suitability under the appropriate internationally recognized conditions and for their continued functioning under the expected service temperature. Refer to IEC 60092-504 and IEC 60529 for testing. ~~TL-~~ IACS UR E10 may be used as an equivalent test standard to IEC 60092-504**.**

05. Section 20 – Electrical Equipment

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item B.2.1 was revised as below:

2. Rating

2.1 Voltage variation during loading

~~Under resistive load, the voltage variation between no-load and full-load shall not exceed 2,5 %.~~The voltage drop in the secondary voltage between no load and rated load, under resistive load, shall comply with definition and calculation methodology in IEC 60076-8.

06. Section 21 – Tests

Revision Date: May 2024

Entry into Force Date: 1 July 2024

New item C.2.7 was added according to UR E26 & E27 New & Rev.1 as below:

2.7 Cyber resilience

Scope of tests, see TL rules, Additional Rules for Cyber Resilience.

PART C – CHAPTER 8 – CHEMICAL TANKERS

01. Section 02 – Ship Survival Capability and Location of Cargo Tanks

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item 2.9.2 was revised according to MEPC.345(78) and MSC.526(106) as below:

2.9.2 In any stage of flooding:

.1 The waterline, taking into account sinkage, heel and trim, shall be below the lower edge of any opening through which progressive flooding or downflooding may take place. Such openings shall include air pipes and openings which are closed by means of weathertight doors or hatch covers and may exclude those openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo tank hatch covers which maintain the high integrity of the deck, remotely operated watertight sliding doors, hinged watertight access doors with open/closed indication locally and at the navigation bridge, of the quick-acting or single-action type that are normally closed at sea, hinged watertight doors that are permanently closed at sea, and sidescuttles of the non-opening type;

PART C – CHAPTER 9 - CONSTRUCTION AND CLASSIFICATION OF YACHTS

01. Section 07 – Classification

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item D3.1.2 was revised as below:

.....

- Tangential force at interface:

$$F = \frac{2000CM_T}{d_{PM}}$$

.....

PART C – CHAPTER 10 - LIQUEFIED GAS TANKER

01. Section 4 – Cargo Containment

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Note was revised to item 4.23.1 according to Rec.174 New as below:

4.23.1 Design basis

Note: The hull design shall be carried out according to main class requirements given in Part A Chapter 1 Hull. In addition, the present rules for Liquefied Gas Carriers, this section give additional design requirements for Liquefied Gas Carriers with independent type C tanks.

For the finite element analysis to assess yielding, buckling and fatigue strength of type C tanks see IACS Rec. 174.

02. Section 11 – Fire Protection and Extinction

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Notes were added to items 11.3.1 and 11.4.3 according to UI GC39 New as below:

……..

Note:

Due to the specifics of liquefied gas bunkering ships, some of these vessels may be provided with additional cargo transfer equipment including transfer loading arms, bunkering booms, transfer hoses, reducers, spool pieces and transfer hoses reels. This additional equipment can be installed in different locations around the ship.

When in use, this additional cargo transfer equipment shall comply, where appropriate, with the requirements of paragraphs 11.3.1.4, 11.3.1.5, 11.4.1, 11.4.3 and 18.10.3.2 for fire detection and fire protection in the cargo area (such as fusible elements, ESD functionality, water spray system protection, dry chemical powder fire- extinguishing systems and drip trays) including hull protection from low temperatures.

03. Section 18 – Operating Requirements

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Note was added to item 18.10.3.2 according to UI GC39 New as below:

18.10.3.2 The ESD system shall be automatically activated on detection of a fire on the weather decks of the cargo area and/or cargo machinery spaces. As a minimum, the method of detection used on the weather decks shall cover the liquid and vapour domes of the cargo tanks, the cargo manifolds and areas where liquid piping is dismantled regularly. Detection may be by means of fusible elements designed to melt at temperatures between 98°C and 104°C, or by area fire detection methods.

Note:

Due to the specifics of liquefied gas bunkering ships, some of these vessels may be provided with additional cargo transfer equipment including transfer loading arms, bunkering booms, transfer hoses, reducers, spool pieces and transfer hoses reels. This additional equipment can be installed in different locations around the ship.

When in use, this additional cargo transfer equipment shall comply, where appropriate, with the requirements of paragraphs 11.3.1.4, 11.3.1.5, 11.4.1, 11.4.3 and 18.10.3.2 for fire detection and fire protection in the cargo area (such as fusible elements, ESD functionality, water spray system protection, dry chemical powder fire- extinguishing systems and drip trays) including hull protection from low temperatures.

PART C – CHAPTER 12 - OIL RECOVERY VESSELS

01. Section 1, 2, 3, 4 and 5

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Chapter 12 was generally revised.

PART C – CHAPTER 19 - INLAND VESSELS

01. Section 9 – Hull Design and Construction - Other Structures

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items G.6.2.2 was revised as below:

6.2.2 Windows shall be built and tested in accordance with ISO 3903 or may be glued to the framing or hull.

PART C – CHAPTER 24 - CHEMICAL RECOVERY VESSELS

01. Section 1 – General Conditions and Requirements

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items D.2 was revised as below:

2. Apart from the documents listed in the TL Rules Chapter 4 – Machinery, Section ~~15~~20, A.3 and Chapter 19 – Inland Waterway Vessels, Section 24, B. the following documents are to be submitted in triplicate:

……..

02. Section 2 – Arrangement and Separation of Spaces

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items A.1 was revised as below:

1. General

Regarding separation of the cargo area from the other areas of the ship, TL Rules, Chapter 1 – Hull, Section ~~24, A.4,~~28 and Chapter 8 – Chemical Tankers, Section 3 apply. Drycargo holds for hazardous substances shall be treated like cargo tanks. With regard to the arrangement of the accommodation, machinery and cargo areas, deviation from the Rules may be possible after examination and with approval from the competent authority.

PART C – CHAPTER 33 - POLAR CLASS SHIPS

01. Section 6 – Machinery Installations

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Section 6 was revised generally revised according to UR I3 Rev.2.

02. Appendix 2

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Appendix 2 was revised generally revised according to UR I3 Rev.2.

PART D – CHAPTER 78 - RULES FOR CLASSIFICATION OF SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS

01. Part A-1

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item 9.2 was revised according to UI GF19 New as below:

Note: To comply with paragraphs 9.2.2, 9.6.1 and 7.3.6.3, two independent safety barriers should be in place, while, as far as practicable, using a minimum of flange connections. There ~~should~~ shall be, no single common flange or other component where one single failure itself may overcome both primary and secondary barriers and may result in a gas leak into the surrounding area causing danger to the persons on board, the environment or the ship.

A single common flange (with two sealing systems) may be accepted at the fuel connection to the gas consumers including GCUs, boilers and components on the engine, such as gas regulating units.

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item 10.3.1.1.1 was revised according to UR M82 New as below:

10.3.1.1.1 For ships constructed on or after 1 January 2024, the exhaust system shall be equipped with explosion relief systems unless designed to accommodate the worst case overpressure due to ignited gas leaks or justified by the safety concept of the engine. A detailed evaluation of the potential for unburnt gas in the exhaust system is to be undertaken covering the complete system from the cylinders up to the open end. This detailed evaluation shall be reflected in the safety concept of the engine. *(For type testing procedure of explosion relief devices for combustion air inlet and exhaust gas manifolds of internal combustion engines using gas as fuel see IACS UR M82.)*

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

01. Section 4 – Design Principles

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item B.3.4 was added as below:

3.4 Stainless Steel

If the measures for corrosion protection as described in Section 3, E and F.7 are fully applied, the corrosion addition t_K can be assumed as 0,2 mm for the stainless steel defined in **TL** Rules, Chapter 2, Section 3, F.

If the under-thickness tolerance for extrusions is more than 7 %, the exceeding difference has to be considered for the calculations.

PART E – CHAPTER 104 - MACHINERY

01. Section 3 - Internal Combustion Engines

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Table 3.3 was revised according to UR M72 Rev.3 as below:

Table 3.3 Documentation for the inspection of components and systems

- Special consideration will be given to engines of identical design and application.
- For engine applications refer to IACS UR M72.~~TL- R M72.~~

No.	Item	Quantity
1	Engine particulars**(11)**	3
2	Material specifications of main parts with information on non-destructive material tests and pressure tests **(1)**	3
3	Bedplate and crankcase of welded design, with welding details and welding instructions **(2)**	3
4	Thrust bearing bedplate of welded design, with welding details and welding instructions **(2)**	3
5	Frame/framebox/gearbox of welded design, with welding details and instructions **(2)**	3
6	Crankshaft, assembly and details	3
7	Thrust shaft or intermediate shaft (if integral with engine)	3
8	Shaft coupling bolts	3
9	Bolts and studs for main bearings	3
10	Bolts and studs for cylinder heads and exhaust valve (two stroke design)	3
11	Bolts and studs for connecting rods	3
12	Tie rods	1
	Schematic layout or other equivalent documents on the engine of **(3)**	
13	Starting air system	3
14	Fuel oil system	3
15	Lubricating oil system	3
16	Cooling water system	3
17	Hydraulic system	3
18	Hydraulic system (for valve lift)	3

No.	Item	Quantity
19	Engine control and safety system	3
20	Shielding of high pressure fuel pipes, assembly **(4)**	3
21	Construction of accumulators for hydraulic oil and fuel oil	3
22	High pressure parts for fuel oil injection system **(5)**	3
23	Arrangement and details of the crankcase explosion relief valve **(6)**	3
24	Oil mist detection and/or alternative alarm arrangements (see Table 3.7)	3
25	Cylinder head	1
26	Cylinder block, engine block	1
27	Cylinder liner	1
28	Counterweights (if not integral with crankshaft), including fastening	3
29	Connecting rod with cap	3
30	Crosshead	3
31	Piston rod	3
32	Piston, assembly **(7)**	3
33	Piston head	3
34	Camshaft drive, assembly **(7)**	1
35	Flywheel	1
36	Arrangement of foundation (for main engines only)	3
37	Fuel oil injection pump	1
38	Shielding and insulation of exhaust pipes and other parts of high temperature which may be impinged as a result of a fuel system failure, assembly	3
39	Construction and arrangement of dampers	3
	For electronically controlled engines, assembly drawings or arrangements of:	3
40	Control valves	3
41	High-pressure pumps	3
42	Drive for high pressure pumps	3
43	Valve bodies, if applicable	3
44	Operation and service manuals **(8)**	1
45	Test program resulting from FMEA (for engine control system) **(9)**	1
46	Production specifications for castings and welding (sequence)	1
47	Type approval certification for environmental tests, control components**(10)**	1
48	Quality requirements for engine production	1

Footnotes:

(1) *For comparison with **TL** requirements for material, NDT and pressure testing as applicable.*

(2) *For approval of materials and weld procedure specifications. The weld procedure specification is to include details of pre and post weld heat treatment, weld consumables and fit-up conditions.*

(3) *Details of the system so far as supplied by the engine manufacturer such as: main dimensions, operating media and maximum working pressures.*

(4) *All engines.*

(5) *The documentation to contain specifications for pressures, pipe dimensions and materials.*

(6) *Only for engines of a cylinder diameter of 200 mm or more or a crankcase volume of 0.6 m^3 or more.*

(7) *Including identification (e.g. drawing number) of components.*

(8) *Operation and service manuals are to contain maintenance requirements (servicing and repair) including details of any special tools and gauges that are to be used with their fitting/settings together with any test requirements on completion of maintenance. The installation of mechanical joints is to be in accordance with the manufacturer's assembly instructions. Where special tools and gauges are required for installation of the joints, these are to be supplied by the*

No.	Item	Quantity
	manufacturer.	
(9)	*Required for engines that rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves. For FMEA process of diesel engine control systems see TL- G 138.*	
(10)	*Documents modified for a specific application are to be submitted to **TL** for information or approval, as applicable. See TL- R M44 Item 3.2.2.2, Appendix 4 and Appendix 5.*	
(11)	*According to TL- R M44, Appendix 3 - "Internal Combustion Engine Approval Application Form and Data Sheet" should be filled and submitted to **TL**.*	

……

Item column was added to Table 3.6.B and footnote 2 was revised according to UR M72 Rev.3 as below:

Table 3.6.B Summary of required documentation for engine components

Item	Part (4), (5), (6), (7), (8)	Material properties (1)	Non-destructive Examination (2)	Hydraulic testing (3)	Dimensional inspection, including surface condition	Visual inspection (Surveyor)	Applicable to engines	Component certificate
	Notes : **(1)** *Material properties include chemical composition and mechanical properties, and also surface treatment such as surface hardening (hardness, depth and extent), peening and rolling (extent and applied force).* **(2)** *Non-destructive examination means e.g. ultrasonic testing, crack detection by MPI or DP. When certain NDE method on the finished component is impractical (for example UT for items 12/13), the NDE method can be performed at earlier appropriate stages in the production of the component, see E.2.1.2.* **(3)** *Hydraulic testing is applied on the water/oil side of the component. Items are to be tested by hydraulic pressure at the pressure equal to 1.5 times the maximum working pressure. High pressure parts of the fuel injection system are to be tested by hydraulic pressure at the pressure equal to 1.5 maximum working pressure or maximum working pressure plus 300 bar, whichever is the less. Where design or testing features may require modification of these test requirements, special consideration may be given.* **(4)** *Material certification requirements for pumps and piping components are dependent on the operating pressure and temperature. Requirements given in this Table apply except where alternative requirements are explicitly given in Chapter 4, Sections 14 and 16.* **(5)** *For turbochargers, see Chapter 4, Section 3.* **(6)** *Crankcase explosion relief valves are to be type tested..* **(7)** *Oil mist detection systems are to be type tested.* **(8)** *For speed governor and overspeed protective devices.* **(9)** *Charge air coolers need only be tested on the water side.* **(10)** *Hydraulic testing is also required for those parts filled with cooling water and having the function of containing the water which is in contact with the cylinder or cylinder liner.*							

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item L.8.3.1.3 was revised according to UR M82 New as below:

8.3.1.3 For type testing procedure of explosion relief devices for combustion air inlet and exhaust gas manifolds of internal combustion engines using gas as fuel see IACS UR M82.

02. Section 4 B – Thermal Turbomachinery/Exhaust Gas Turbochargers

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item numbers edited and items A.3.2, A.4.2, A.4.4, C.2, C.4.3 and D.3.2 were revised according to UR M73 Rev.2 as below:

- Documentation* of safe torque transmission when the disc is connected to the shaft by an interference fit, see C.3~~7.4~~.

……

4.2 For category C, this shall be verified by means of periodic product audits of an Alternative Certification Scheme (ACS; see Classification and Surveys, Section 2, item F) by **TL**.

……

4.4 Turbochargers shall be delivered with:

• For category C, a society certificate, which ~~at~~ as a minimum cites the applicable type approval and the ACS, when ACS applies.

• For category B, a work's certificate, which ~~at~~ as a minimum cites the applicable type approval, which includes production assessment.

……

2.2 For category B and C, containment shall be documented by testing.

……

The following requirements in item 2.3 and 2.4 are applicable for a type approval of turbochargers.

2.2~~3~~ The minimum speeds for the containment test are defined as follows:

……

2.4 The containment test has to be performed at ~~working temperature~~ a temperature which is not lower than the maximum allowable temperature of the turbocharger to be specified by the manufacturer. The theoretical (design) natural burst speeds of compressor and turbine have to be submitted for information.

2.5 Manufacturers are to determine whether cases more critical than those defined in items 2.3 and 2.4 exist with respect to containment safety. Where such a case is identified, evidence of containment safety shall also be provided for that case.

2.3~~6~~ A numerical prove such as Finite Element Method (FEM) of sufficient containment integrity of the casing based on calculations by means of a simulation model may be accepted provided that:

……

- The design of the turbocharger regarding the geometry and kinematics is to be similar to ~~that of one~~ the turbocharger that was used for the reference ~~which has passed the~~ containment test. ~~In general totally new designs will call for new containment tests,~~

……

2.7 In cases where a totally new design*** is adopted for a turbocharger for which an application for type approval certification has been requested, new reference containment tests are to be performed.

*** Totally new design means the principal differences between a new turbocharger and previous ones are related to geometry and kinematics. The turbochargers are to be regarded as having a totally new design if the structure and/or material of the turbocharger casings are changed, or any of, but not limited to, the following items is changed from the previous design.

- Maximum permissible exhaust gas temperature
- Number of bearings
- Number of turbine blades
- Number of turbine wheels and/or compressor wheels
- Direction of inlet air and/or exhaust gas (e.g., axial flow orientation, radial flow orientation)
- Type of the turbocharger drive (e.g., axial turbine type, radial turbine type, mixed flow turbine type)

2.48 In general a **TL** Surveyor or the Head Office has to be involved for the containment test.

~~2.5~~ 3. Disc-shaft shrinkage fit

~~2.5~~3.1 Applicable to Category C

~~2.5~~3.2 In cases where the disc is connected to the shaft with interference fit, calculations shall substantiate safe torque transmission during all relevant operating conditions such as maximum speed, maximum torque and maximum temperature gradient combined with minimum shrinkage amount.

~~3~~4. Type Testing

~~3~~4.1 Applicable to Categories B and C

~~3~~4.2 The type test for a generic range of turbochargers may be carried out either on an engine (for which the turbocharger is foreseen) or in a test rig.

~~3~~4.3 Turbochargers for the low, medium, and high-speed engines are to be subjected to at least 500 load cycles at the limits of operation. This test may be waived if the turbocharger together with the engine is subjected to this kind of low cycle testing, see Section 2, E.3.

~~3~~4.4 The suitability of the turbocharger for such kind of operation is to be preliminarily stated by the manufacturer.

~~3~~4.5 The rotor vibration characteristics shall be measured and recorded in order to identify possible sub-synchronous vibrations and resonances.

~~3~~4.6 The type test shall be completed by a hot running test at maximum permissible speed combined with maximum permissible temperature for at least one hour.

……

~~3~~4.7 The extent of the surveyor's presence during the various parts of the type tests is left to the discretion of **TL**.

~~4~~5. Spare Parts

The rotating assembly parts (rotor, wheels and blades) as well as turbocharger casings have to be replaced by spare parts which are manufactured by **TL** approved manufacturers according to the previously approved drawings and material specifications.

……

3.2 Upon satisfactory assessment in combination with a bench test carried out on a sample basis with **TL** Surveyor's attendance, the drawing approval and tests are not required. ~~The scope of the testing for materials and components has to be fulfilled unchanged according to C.1. to C.3.~~

03. Appendix IV – Guidance for Evaluations of Fatigue Tests

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item D.3 was revised as according to UR M53 Rev.5 below:

3. Use of results and crankshaft acceptability

In order to combine tested bending and torsion fatigue strength results in calculation of crankshaft acceptability, see Section ~~2~~3 item D.7, the Gough-Pollard approach and the maximum principal equivalent stress formulation can

be applied for the following cases:

~~Related to~~ At the crankpin ~~diameter~~fillet:

$$Q = \left(\sqrt{\left(\frac{\sigma_{BH} + \sigma_{add}}{\sigma_{DWCT}} \right)^2 + \left(\frac{\tau_H}{\tau_{DWCT}} \right)^2} \right)^{-1}$$

where:

~~σ_{DWOT} fatigue strength by means of largest principal stress from torsion testing~~

σ_{DWCT} fatigue strength by bending testing

τ_{DWCT} fatigue strength by torsion testing

For other parameters see Section 3 items D.2.1.3, D.2.2.3 and D.4.

Related to crankpin oil bore:

~~$$\sigma = \left(\sqrt{\left(\frac{\sigma_{BO}}{\sigma_{DWOT}} \right)^2 + \left(\frac{\tau_O}{\tau_{DWOT}} \right)^2} \right)^{-1}$$~~

$$Q = \frac{\sigma_{DWOT}}{\sigma_v}; \qquad \sigma_v = \frac{1}{3} * \sigma_{BO} * \left[1 + 2 * \sqrt{1 + \frac{9}{4} * \left(\frac{\sigma_{TO}}{\sigma_{BO}} \right)^2} \right]$$

where:

~~σ_{DWCT} fatigue strength by bending testing~~

~~τ_{DWCT} fatigue strength by torsion testing~~

σ_{DWOT} fatigue strength by means of largest principal stress from torsion testing

At the journal fillet:

~~$$\sigma = \left(\sqrt{\left(\frac{\sigma_{BG}}{\sigma_{DWJT}} \right)^2 + \left(\frac{\tau_G}{\tau_{DWJT}} \right)^2} \right)^{-1}$$~~

$$Q = \left(\sqrt{\left(\frac{\sigma_{BG} + \sigma_{add}}{\sigma_{DWJT}} \right)^2 + \left(\frac{\tau_G}{\tau_{DWJT}} \right)^2} \right)^{-1}$$

where:

σ_{DWJT} fatigue strength by bending testing

τ_{DWJT} fatigue strength by torsion testing

For other parameters see Section 3 items D.2.1.3, D.2.2.3 and D.4.

04. Section 10 – Spare Parts

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.4 was revised according to REC 26 Rev.2, REC 27 Rev.2, REC 28 Rev.2, REC 29 Rev.2 and REC 30 Rev.2 as below:

4. Assessment of the recommended spare parts to be carried onboard ship can be determined through risk assessment and is to be agreed by the Naval Authority and TL. For details, refer to Part B, Chapter 4, Machinery, Section 17.

Footnote (6) of Table 10.1 was deleted according to REC 26 Rev.2 as below:

Table 10.1 Spare parts for main engines (1), (4), (5), ~~(6)~~

Range of spare parts	A	B
(1) *in the case of multi-engine installations, the minimum required spares are only necessary for one engine* **(2)** *a) engines with one or two fuel-injection valves per cylinder: one set of fuel valves, complete* *b) engines with more than two fuel injection valves per cylinder: two valves complete per cylinder plus a corresponding number of valve parts (excluding the valve bodies) which make it possible to form a complete spare set by re-using the operational parts of the dismantled valves* **(3)** *spare parts for exhaust-gas turbocharger and auxiliary blower may be omitted if emergency operation of the main engine after failure is demonstrably possible.* *The requisite blanking and blocking arrangements for the emergency operation of the main engine are to be available on board.* **(4)** *the necessary tools and equipment for fitting the required spare parts must be available on board* **(5)** *spare parts are to be replaced immediately as soon as they are "used-up"* **~~(6)~~** ~~*For electronically controlled engines spare parts as recommended by the engine manufacturer are to be provided*~~		

Table 10.2 was revised according to REC 27 Rev.2 as below:

Table 10.2 Spare parts for auxiliary engines driving electric generators for essential equipment

Range of spare parts		A
Main bearings	Bearings or shells for one bearing of each size and type fitted, complete with shims, bolts and nuts	1
Valves	Exhaust valves, complete with casings, seats, springs and other fittings for one cylinder	2 sets
	Inlet valves, complete with casings, seats, springs and other fittings for one cylinder	1 set
	Starting air valve, complete with casing, seat, springs and other fittings	1
	Overpressure control valve, complete	1
	Fuel valves of each size and type fitted, complete, with all fittings, for one engine	¼ set
Connecting rod	Bottom end bearings or shells of each type, complete with all fittings	1
	Gudgeon pin with bush for one cylinder	1
Piston rings	Piston rings, for one cylinder	1 set
Fuel injection pumps	Fuel injection pump complete or, when replacement of individual components at sea is practicable, complete pump element with associated valves, seals, springs, etc. or equivalent high pressure fuel pump	1
Fuel injection pipes	High pressure fuel pipe of each size and shape fitted, complete with fittings	1
Gasket and packings	Special gaskets and packings of each size and type fitted, for cylinder covers and cylinder liners for one cylinder	1 set
Control, alarm and safety system	Parts essential for safe engine operation	1 set

Note

1. *Where the number of generating sets (including stand-by units) is greater than called for by the Rules, no spares are required for the auxiliary engines.*
2. *Where several diesel engines of the same type are installed by way of generator drive spare parts are required for one engine only.*
3. *No spares are required for the engines driving emergency generator sets.*
4. ~~*For electronically controlled engines spare parts recommended by the engine manufacturer are to be provided.*~~

Table 10.6 was revised according to REC 30 Rev.2 as below:

Table 10.6 Spare parts for air compressors for essential services

Range of spare parts	A	B
Piston ring of each type and size fitted for one piston	1 set	1 set
Suction and delivery valves complete of each size ~~and type~~ fitted in one unit	½ set	½ set

Table 10.7 was revised according to REC 30 Rev.2 as below:

Table 10.7 Spare parts for pumps

Range of spare parts		A	B
Piston pumps	Valve with seats and springs each size fitted	1 set	1 set
	Piston rings each type and size for one piston	1 set	1 set
Centrifugal pumps	Bearing of each type and size	1	1
	Rotor sealings of each type and size	1	1
Gear and screw type pumps	Bearings of each type and size	1	1
	Rotor sealings of each type and size	1	1

Note

Where, for a system a stand-by pump of sufficient capacity is available, the spare parts may be dispensed.

PART E – CHAPTER 105 - NAVAL SHIP TECHNOLOGY, ELECTRICAL INSTALLATION

01. Section 05 – Low-Voltage Switchgear Assemblies

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.1.15 was revised as below:

1.15 Switchboards of electrical power generation plants, main group switchboards and other switchboards with more than 1 control section or 5 total indication lamps, starter panels with more than 3 lamps or starter panel cabinet which contains more than one control section (i.e. 2 pumps etc.) shall have lamp test option. Switchboards with HMI (Human Machine Interface) panels with visual and audible alarm functionality may be exempt from the lamp test option.

02. Section 10 – Computer Systems

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Section 10 was totally revised according to UR E22 Rev.3.

03. Section 14 – Electrical Equipment

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item C.2.1 was revised as below:

2. Rating

2.1 Voltage variation during loading

~~Under resistive load, the voltage variation between no-load and full-load shall not exceed 2,5 %.~~The voltage drop in the secondary voltage between no load and rated load, under resistive load, shall comply with definition and calculation methodology in IEC 60076-8.

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

01. Section 8 – Piping Systems, Valves and Pumps

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item T.3 was revised as below:

3. Additional Rules for ships with classification mark FS

……..

01. Section 20 – Spare Parts

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Item A.4 was added according to REC 26 Rev.2, REC 27 Rev.2, REC 28 Rev.2, REC 29 Rev.2 and REC 30 Rev.2 as below:

4. Assessment of the recommended spare parts to be carried onboard ship can be determined through risk assessment and is to be agreed by the Naval Authority and TL. For details, refer to Part B, Chapter 4, Machinery, Section 17.

Table 20.2 was revised according to REC 30 Rev.2 as below:

Table 20.2 Spare parts for pumps

Range of spare parts		**A**	**B**
Piston pumps	Valve with seats and springs of each size fitted	1set	1set
	Piston rings of each type and size for one piston	1set	1set
Centrifugal pumps	Bearing of each type and size	1	1
	Rotor sealings of each type and size	1	1
Gear and screw type pumps	Bearings of each type and size	1	1
	Rotor sealings of each type and size	1	1
Where, for a system served by a pump, a stand-by pump of sufficient capacity is available, the spare parts may be dispensed with.			

ADDITIONAL RULES – REGULATIONS FOR THE PERFORMANCE OF THE TYPE TESTS PART 1 - TEST SPECIFICATION FOR TYPE APPROVAL

01. General

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Table was revised according to UR E10 Rev.9 as below:

Type testing condition for equipment covered by item A.

NO.	TEST	PROCEDURE ACC. TO:*	TEST PARAMETERS	OTHER INFORMATION
	***** indicates the testing procedure which is normally to be applied. However, equivalent testing procedure may be accepted by **TL** provided that the requirements stated in the other columns are fulfilled. ~~The latest edition of the normative reference applies.~~ Later versions (including revisions) of the international standards specified in this Rules are acceptable for use, provided the **TL** determines them to be equivalent to the technical specifications of this Rules.			
1.	Visual inspection	-	-	- conformance to drawings, design data
...	...	...	...	...
13.	Electrostatic discharge	IEC 61000-4-2:2008	Contact discharge: 6kV Air discharge: 2kV, 4kV, 8kV Interval between single discharges: 1 sec. No. of pulses: 10 per polarity According to test level 3.	- to simulate electrostatic discharge as may occur when persons touch the appliance; - the test is to be confined to the points and surfaces that can normally be reached by the operator; Performance Criterion B (See Note 4).
14.	Electromagnetic field	IEC 61000-4-3:2020 or IEC 61000-4-3:2006+AMD1:2007+AMD2:2010	Frequency range: 80 MHz to 6 GHz Modulation**: 80% AM at 1000Hz Field strength: 10V/m Frequency sweep rate: ≤1.5 x 10^{-3} decades/s (or 1%/3 sec) According to test level 3.	- to simulate electromagnetic fields radiated by different transmitters; - the test is to be confined to the appliances exposed to direct radiation by transmitters at their place of installation. - Performance criterion A (See Note 5) **If for tests of equipment an input signal with a modulation frequency of 1000 Hz is

NO.	TEST	PROCEDURE ACC. TO:*	TEST PARAMETERS	OTHER INFORMATION
				necessary a modulation frequency of 400 Hz may be chosen. - If an equipment is intended to receive radio signals for the purpose of radio communication (e.g. wifi router, remote radio controller), then the immunity limits at its communication **1.** frequency do not apply, subject to the provisions "Specific requirements for wireless data links" in ~~TL~~IACS UR E22~~.5.2~~
...	...	...	…	...
18.	Surge	IEC 61000-4-5:2017	Test applicable to AC and DC power ports Open-circuit voltage: Pulse rise time: 1.2 µs (front time) Pulse width: 50 µs (time to half value) Amplitude (peak): 1kV line/earth; 0.5kV line/line Short-circuit current: Pulse rise time: 8 µs (front time) Pulse width: 20 µs (time to half value) Repetition rate: ≥ 1 pulse/min No of pulses: 5 per polarity Application: continuous According to test level 2.	- interference generated for instance, by switching "ON" or "OFF" high power inductive consumers; - test procedure in accordance with figure 10 of the standard for equipment where power and signal lines are identical; performance criterion B (see Note 4).

<table>
<tr><th>NO.</th><th>TEST</th><th>PROCEDURE ACC. TO:*</th><th>TEST PARAMETERS</th><th>OTHER INFORMATION</th></tr>
<tr>
<td>19.</td>
<td>Radiated
Emission</td>
<td>CISPR 16-2-3:2016
IEC 60945:2002 for 156-165 MHz</td>
<td>Limits below 1000 MHz

For equipment installed in the bridge and deck zone.

<table>
<tr><th>Frequency range:</th><th>Quasi peak limits:</th></tr>
<tr><td>0.15 - 0.3 MHz</td><td>80 - 52 dBµV/m</td></tr>
<tr><td>0.3 - 30 MHz</td><td>52 - 34 dBµV/m</td></tr>
<tr><td>30 - 1000 MHz</td><td>54 dBµV/m</td></tr>
<tr><td>except for:
156 -165 MHz</td><td>
24 dBµV/m</td></tr>
</table>
For equipment installed in the general power distribution zone.

<table>
<tr><th>Frequency range:</th><th>Quasi peak limits:</th></tr>
<tr><td>0.15 - 30 MHz</td><td>80 - 50 dBµV/m</td></tr>
<tr><td>30 - 100 MHz</td><td>60 - 54 dBµV/m</td></tr>
<tr><td>100 - 1000 MHz</td><td>54 dBµV/m</td></tr>
<tr><td>except for:
156 -165 MHz</td><td>
24 dBµV/m</td></tr>
</table>
Limits above 1000 MHz
<table>
<tr><th>Frequency range:</th><th>Average limit:</th></tr>
<tr><td>1000-6000 MHz</td><td>54 dBµV/m</td></tr>
</table>
</td>
<td>- procedure in accordance with the standard but distance 3 m between equipment and antenna

- for the frequency band 156 MHz to 165 MHz the measurement shall be repeated with a receiver bandwidth of 9 kHz (as per IEC 60945:2002).

- alternatively the radiation limit at a distance of 3 m from the enclosure port over the frequency
156 MHz to 165 MHz shall be 30 dB micro-V/m peak (as per IEC 60945:2002).

- procedure in accordance with the standard (distance 3 m between equipment and antenna)
Equipment intended to transmit radio signals for the purpose of radio communication (e.g. wifi router, remote radio controller) may be exempted from limit, within its communication frequency range, subject to the provisions “Specific requirements for wireless data links” in ~~TL~~IACS UR E22~~.5.2~~</td>
</tr>
</table>

ADDITIONAL RULES – ADDITIONAL RULE FOR EXHAUST GAS CLEANING SYSTEMS

Revision Date: May 2024

Entry into Force Date: 1 July 2024

Items 10.2.3, 10.2.4, 10.2.11, 10.2.16 and 10.3 were revised on previous Guideline version according to UR M81 Rev.1 as below, after that this Guideline was published as Additional Rule:

10.2.3 If a storage tank for chemical treatment fluids and EGC residue/overflow tank is installed in a closed compartment, the area is to be served by an effective mechanical ventilation system of extraction type providing not less than 6 air changes per hour which is independent from the ventilation system of other spaces. ~~accommodation, service spaces, or control stations.~~ The ventilation system is to be capable of being controlled from outside the compartment. A warning notice requiring the use of such ventilation before entering the compartment shall be provided outside the compartment adjacent to each point of entry.

10.2.4 The storage tank and EGC residue/overflow tank may be located within the engine room. In this case, the requirements of 2.3 shall be complied with, except that a separate ventilation system is not required when the general ventilation system for the space ~~providing not less than 6 air changes per hour~~ is arranged so as to provide an effective movement of air in the vicinity of the storage tank and is maintained in operation continuously except when the storage tank is empty and has been thoroughly ventilated.

……

10.2.11 Storage tanks, EGC residue/overflow tanks and pipes/piping systems and drip trays for chemical treatment fluids which transfer undiluted chemical treatment fluids are to be of steel or other equivalent material with a melting point above 925 degrees C.

……

10.2.16 Storage tanks for chemical treatment fluids are to be arranged so that they can be safely emptied of the fluids and ventilated by means of portable or permanent systems.

10.3 Piping

10.3.1 Miscellaneous piping arrangements

~~**10.3.1**~~ Supply, bunkering and transfer lines for chemical treatment fluid systems are not to be located over, or in close proximity to, boilers, steam piping, exhaust systems, hot surfaces required to be insulated, or other sources of ignition.

10.3.2 Requirement for Exhaust Gas Cleaning Systems discharge water pipeline

10.3.2.1 Overboard discharges from exhaust gas cleaning system (EGCS) are not to be interconnected to other systems.

10.3.2.2 Due consideration is to be given to the location of overboard discharges with respect to vessel propulsion features, such as thrusters, propellers or to prevent any discharge water onto survival craft during abandonment.

10.3.2.3 The piping material for the EGCS discharge water pipeline system is to be selected based on the corrosive nature of the liquid media.

10.3.2.4 Special attention is to be paid to the corrosion resistivity of EGCS overboard discharge piping. Where applicable, adequate arrangements are to be provided to prevent galvanic corrosion due to the use of dissimilar metals.

10.3.2.5 In case distance piece is fitted between the outboard discharge valve and the shell plating, it shall be made of corrosion resistant material steel or be coated with an anti-corrosive material suitable for the operating environment. The thickness of the distance piece shall be at least the minimum values specified in .1 and .2 as below; otherwise Sch.160 thickness specified in piping standards shall, as far as practicable, be used.

i) 12 mm in cases where complete pipe is made of corrosion resistant material steel.

ii) 15 mm of mild steel in cases where the inside the pipe is treated with an anticorrosive coating or fitted with a sleeve of corrosion resistant material.

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