TÜRK LOYDU RULE CHANGE SUMMARY

TL NUMBER: 04/2022 JUNE 2022

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

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

RULE CHANGE SUMMARY

CLASSIFICATION AND SURVEYS

No	Item
01	Section 2
02	Section 3

CHAPTER 1 – HULL

No	Item
01	Section 11
02	Section 12
03	Section 17
04	Section 21
05	Section 26

CHAPTER 2 – MATERIALS

No	Item
01	Section 3

CHAPTER 3 – WELDING

No	Item
01	Section 12

CHAPTER 4 - MACHINERY

No	Item
01	Section 1
02	Section 2
03	Section 5
04	Section 7
05	Section 9
06	Section 10
07	Section 16
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CHAPTER 5 – ELECTRICAL INSTALLATION

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06	Section 15
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CHAPTER 10 – LIQUFIED GAS TANKERS

01	Section 11

CHAPTER 28 – VENTILATION

01	Section 1

CHAPTER 35 – TENTATIVE RULES FOR SHIPS LESS THAN 500 GT

01	B Section 4
02	D Section 4
03	D Section 6

CHAPTER 37 – TENTATIVE RULES FOR THE CLASSIFICATION OF PASSENGER CRAFT

01	Section 7

ADDITIONAL RULE – INSTALLATION OF BALLAST WATER MANAGEMENT SYSTEMS

01	General

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

01	General

GUIDELINES – GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS

01	Section B
01	Section C

CLASSIFICATION AND SURVEYS

01. Section 2 – Classification

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Table 2.1 was revised as below:

Class Notation	Description	Application	Rule Requirement, Design (1)	Rule Requirement, Survey
~~**CAR**~~ **FERRY**	Ships designed for the transportation of motor vehicles ~~(~~and ~~possibly also~~ passengers~~)~~ engaged in ferry services	~~Car~~ Ferries	- Part A (Chapter 1 – Hull, Chapter 2 – Material, Chapter 3 – Welding), - Part B (Chapter 4 - Machinery, Chapter 4-1 Automation, Chapter 5 – Electrical Installations), - All requirements related to the notation **RO-RO PASSENGER SHIP**	Classification and Surveys Section 3

02. Section 3 – Surveys

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Note under item C.4.3.2 was revised according to UR Z16 Rev.4 Corr.1 as below:

Note:

See also TL-G ~~35~~ 120 ~~Inspection and maintenance~~ Survey of electrical equipment installed in hazardous areas on tankers.

PART A – CHAPTER 1 - HULL

01. Section 11 - Watertight Bulkheads

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item A.4.1.1 was revised as below:

4.1.1 A collision bulkhead shall be located at a distance from the forward perpendicular, not less than 0.05L_C or 10 m, whichever is less, and, except ~~as~~ may be permitted by ~~TL~~ the Administration, not more than 0.08L_C or 0.05L_C+3 m, whichever is greater, see Figure 11.1.

Revision Date: June 2022

Entry into Force Date: 01 July 2022

Item A.4.2.2 was revised as below:

.....

In cargo ships a stern tube enclosed in a watertight space of moderate volume, such as an afterpeak tank, where the inboard end of the stern tube extends through the afterpeak/engine room watertight bulkhead into the engine room is considered to be an acceptable solution satisfying the requirement of Chapter II-1, Regulation 12.11 of SOLAS 1974, as amended, provided the inboard end of the stern tube is effectively sealed at the afterpeak/engine room bulkhead by means of an approved watertight/oiltight gland system. Where the shafting arrangements make enclosure of the stern tube in a watertight compartment impractical, alternative arrangements are specially considered. The aft peak bulkhead location on ships powered and/or controlled by equipment that do not require the fitting of a stern tube and/or rudder trunk are also subject to special consideration.

02. Section 12 - Tank Structures

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item A.8 was added according to UR F45 New as below:

8. Separation of Tanks Containing Chemical Substances

8.1 For separation of tanks containing chemical substances for ballast water managements system see Additional Rule for Installation of Ballast Water Management Systems.

8.2 For separation of tanks containing chemical substances for exhaust gas cleaning systems see Guidelines For Exhaust Gas Cleaning Systems.

03. Section 17 - Equipment

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item E.2.3 and 2.4 were revised according to UR L4 Rev.3 Corr.2 as below:

2.3 Where a means of access to spurling pipes or cable lockers is located below the weather deck, the access cover and its securing arrangements are to be in accordance with recognized standards (refer to TL-R L4) or equivalent for watertight manhole covers. Butterfly nuts and/or hinged bolts are prohibited as the securing mechanism for the access cover.

2.4 Spurling pipes through which anchor cables are led are to be provided with permanently attached closing appliances (refer to TL-R L4) to minimize water ingress.

04. Section 21 – Structural Fire Protection

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item B.4.2.2 [10], [11], [12], [13], [14] and item 4.3.2 [5], [6], [7], [9] were revised according to UR F45 New as below:

[10] Tank, voids and auxiliary machinery spaces having little or no fire risk

……..

- Ballast Water Management Room (BWMR) having little or no fire risk

[11] Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk

……..

- BWMR having moderate fire risk

[12] Machinery spaces and main galleys

……..

- BWMR containing oil-fired inert gas generators

[13] Store-rooms, workshops, pantries, etc.

……..

- Spaces where the storage of liquid or solid chemicals for Ballast Water Management System (BWMS).

……..

[14] Other spaces in which flammable liquids are stowed

- Paint lockers

- Store-rooms containing flammable liquids (including dyes, medicines, flammable products for BWMS etc.).

……..

4.3.2 For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in the following categories [1] to [11].

……..

[5] Service spaces (low risk)

……..

- Spaces where the storage of liquid or solid chemicals for BWMS if the surface area is less than 4 m^2 and if no flammable products are stored.

……..

[6] Machinery spaces of category A

……..

- BWMR containing oil-fired inert gas generators

[7] Other machinery spaces

……..

- BWMR

[9] Service spaces (high risk)

……..

- Spaces where the storage of liquid or solid chemicals for BWMS if the surface area of 4 m^2 or more

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Notes under item B.12.3.1.3 and C.8.3.1.3 were revised according UI SC64 Rev.2 as below:

Note: *Ducts or pipes with free sectional area of 0,075m^2 or less need not to be fitted with fire damper at their passage through Class "A" divisions ~~provided that the requirements of~~ in those cases indicated in 12.2.2~~,~~ and 12.2.3~~, 9.3, 8.3 and 12.7.2 are complied with~~. The fire damper can be omitted if the duct is arranged in compliance with the requirements of 12.2.4.2.1 and 12.2.4.2.2.*

Note: *Ducts or pipes with free sectional area of 0,075m^2 or less need not to be fitted with fire damper at their passage through Class "A" divisions ~~provided that the requirements of~~ in those cases indicated in 8.2.2~~,~~ and 8.2.3~~, B.9.3 and B.8.3 are complied with~~. The fire damper can be omitted if the duct is arranged in compliance with the requirements of 8.2.4.2.1 and 8.2.4.2.2.*

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Items B.17.2.8.4 and C.11.2.8.4 were added according to UR F45 New as below:

17.2.8.4 An emergency escape breathing apparatus (EEBD) is to be provided in the BWMR. This emergency escape breathing apparatus may be one of the EEBDs provided in accordance with the requirements of SOLAS II-2/13.

An EEBD need not be required for BWMS of cat.1 as per Table 1 in **TL** Additional Rule "Installation of Ballast Water Management Systems".

……..

11.2.8.4 An emergency escape breathing apparatus (EEBD) is to be provided in the BWMR. This emergency escape breathing apparatus may be one of the EEBDs provided in accordance with the requirements of SOLAS II-2/13.

An EEBD need not be required for BWMS of cat.1 as per Table 1 in **TL** Additional Rule "Installation of Ballast Water Management Systems".

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item C.4.1.3 [5], [6], [7] and [9] were revised according to UR F45 New as below:

[5] Service spaces (low risk)

……..

- Spaces where the storage of liquid or solid chemicals for BWMS if the surface area is less than 4 m^2 and if no flammable products are stored

……..

[6] Machinery spaces of category A

……..

- BWMR containing oil-fired inert gas generators

[7] Other machinery spaces

……..

- BWMR

[9] Service spaces (high risk)

……..

- Spaces where the storage of liquid or solid chemicals for BWMS if the surface area of 4 m^2 or more

[*] Provision chambers are to be treated as store rooms

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item E.2.3.2.3 [5], [6], [7], [8] and [9] were revised according to UR F45 New as below:

[5] Service spaces (low risk)

……

- Spaces where the storage of liquid or solid chemicals for BWMS if the surface area is less than 4 m^2 and if no flammable products are stored

[6] Machinery spaces of category A

……

- BWMR containing oil-fired inert gas generators

[7] Other machinery spaces

……

- BWMR

[8] Cargo pump rooms

- Spaces containing cargo pumps and entrances and trunks to such spaces.
- BWMS located in the cargo area
- Spaces where the storage of liquid or solid chemicals for BWMS located in the cargo area

[9] Service spaces (high risk)

……

- Spaces where the storage of liquid or solid chemicals for BWMS if the surface area of 4 m^2 or more

05. Section 26 – Stability

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Pararaph was added to end of item B.8.3 according UI SC161 Rev.2 and MSC.1/Circ.1653 as below:

See also IMO MSC.1/Circ.1653 “Timber deck cargo in the context of damage stability requirements” (TL-I SC161).

Item E was revised according UI SC161 Rev.2 and MSC.1/Circ.1653 as below:

……

See also IMO MSC.1/Circ.1653 ~~and TL- I~~ “Timber deck cargo in the context of damage stability requirements” (TL-I SC161).

PART A – CHAPTER 2 - MATERIALS

01. Section 3 - Rolled Steel Plates, Sections and Bars

Revision Date: May 2022

Entry into Force Date: 01 July 2022

Item E was revised according to UR W1 Rev.4 as below:

E. Steels for ~~Cargo Tanks of Gas Tankers~~ ships carrying liquefied gases in bulk and ships using gases or other low-flashpoint fuels

1. Scope

1.1 This sub-section gives ~~the~~ additional requirements ~~for plates, sections, pipes, forgings and castings used in the construction of cargo tanks, cargo process pressure vessels, cargo and process piping and secondary barriers of gas tankers. This sub-section also gives the requirement for plates and sections of hull structural steels which are subject to reduced temperature due to the cargo and which are not forming part of secondary barrier~~ to the ones prescribed Part C, Chapter 10 - Liquefied Gas Tankers or Part D, Chapter 78 - Rules for Classification of Ships Using Gases or Other Low-Flashpoint Fuel.
~~The requirements for rolled products, forgings and castings are given in Table 3.18 through Table 3.21a~~

1.2 The manufacture, testing, inspection and documentation shall be in accordance with the general practice of **TL** ~~and the specific requirement given in this sub-section~~.

~~**2. General**~~

~~**2.1 Tensile test**~~

~~The test specimens and procedures shall be in accordance with Section 2. Tensile strength, yield stress and elongation shall be approved by **TL.**~~

~~For carbon-manganese steel and other materials with definitive yield points, consideration shall be given to the limitation of the yield to tensile ratio.~~

~~**2.2 Charpy V-notch impact test**~~

~~Acceptance tests shall include Charpy V-notch impact tests unless otherwise approved. The specified Charpy V-notch impact test requirements are minimum average energy values for three full size (10mm x 10mm) specimens and minimum single energy values for individual specimens. Dimensions and tolerances of Charpy V-notch impact test specimens shall be in accordance with the requirements of Section 2. The testing of sub-size specimens shall be in accordance with Section 2.~~

~~For base metal, the largest size Charpy V-notch impact test specimens possible for the material thickness shall be machined, with the specimens located as near as practicable to a point midway between the surface and the centre of the thickness and the length of the notch perpendicular to the surface, as shown in Figure 3.7a. In the case where the material thickness is 40mm or below, the Charpy V-notch impact test specimens shall be cut with their~~

~~edge within 2mm from the "as rolled" surface with their longitudinal axes either parallel or transverse to the final direction of rolling of the material.~~

~~For a weld specimen, the largest size Charpy V-notch impact test specimens possible for the material thickness shall be machined, with the specimens located as near as practicable to a point midway between the surface and the centre of the thickness. In all cases, the distance from the surface of material to the edge of the specimen shall be approximately 1mm or greater. In addition, for double V butt welds, specimens shall be machined closer to the surface of the second welded side. The specimens shall be taken generally at each of the following locations, as shown in Figure 3.7b, on the centreline of the welds, the fusion line and 1 mm, 3 mm and 5 mm from the fusion line.~~

~~The re-testing of Charpy V-notch impact test specimens shall be in accordance with Section 2.~~

~~If the average value of the three initial Charpy V-notch impact test specimens fails to meet the stated requirements, or the value for more than one specimen is below the required average value, or when the value for one specimen is below the minimum value permitted for a single specimen, three additional specimens from the same material may be tested and the results be combined with those previously obtained to form a new average. If this new average complies with the requirements and if no more than two individual results are lower, than the required average and no more than one result is lower than the required value for a single specimen, the piece or batch may be accepted.~~

~~2.3 Bend test~~

~~The bend test may be omitted as a material acceptance test, but is required for weld tests. The test specimens and procedures shall be in accordance with Section 2. The bend tests shall be transverse bend tests, which may be face, root or side bends at the discretion of **TL.** However, longitudinal bend tests may be required in lieu of transverse bend tests in cases where the base material and weld metal have different strength levels.~~

~~2.4 Section observation and other testing~~

~~Macrosection, microsection observations and hardness tests may also be required by **TL** and they shall be carried out in accordance with the Rules of **TL**, where required.~~

~~2.5 Definitions~~

~~(a) Where reference is made in this sub-section to TL-A, TL-B, TL-D, TL-E, TL-AH, TL-DH, TL-EH and TL-FH hull structural steels, these steel grades are hull structural steels according to Section 3, B.~~

~~(b) The definitions of "Piece" and "Batch" are given in Section 1.~~

~~(c) The definitions of "controlled rolling (CR)", "Thermo-mechanical controlled processing (TMCP)" and "Accelerated cooling (AcC)" are given in Section 3,A.~~

~~3~~2. Material Requirements

~~3.1~~ ~~The requirements for materials of construction are shown in the tables as follows:~~

~~Table 3.18: Plates, pipes (seamless and welded), sections and forgings for cargo tanks and process pressure vessels for design temperatures not lower than 0°C.~~

~~Table 3.19: Plates, sections and forgings for cargo tanks, secondary barriers and process pressure vessels for design temperatures below 0°C and down to - 55°C.~~

~~Table 3.20: Plates, sections and forgings for cargo tanks, secondary barriers and process pressure vessels for design temperatures below - 55°C and down to - 165°C.~~

~~Table 3.21: Pipes (seamless and welded), forgings and castings for cargo and process piping for design temperatures below 0°C and down to - 165°C.~~

~~Table 3.21a: Plates and sections for hull structures required by Chaper 10, Section 4,D.19.~~

~~The requirements for castings and forgings intended for cargo and process piping for design temperature above 0°C are at the discretion of **TL.**~~

~~**3.2** Materials with alternative chemical composition or mechanical properties may be accepted by special agreement with **TL.**~~

~~**3.3** Where post-weld heat treatment is specified or required, the properties of the base materials shall be determined in the heat treated condition in accordance with the applicable table and the weld properties shall be determined in the heat treated condition in accordance with Chapter 3, Section 12,J. In cases where a post-weld heat treatment is applied, the test requirements may be modified at the discretion of **TL.**~~

~~**3.4** Where reference is made to hull structural steels, the requirements of Section 3,B for appropriate grades apply.~~

In addition to Part C, Chapter 10 Table 6.1 or Part D, Chapter 78 Table 7.1 for design temperature not lower than 0°C, the following applies.

Table 3.18 Plates, pipes (seamless and welded), ~~(1) (2)~~ sections and forgings for cargo tanks, fuel tanks and process pressure vessels for design temperatures not lower than 0°C.

~~CHEMICAL COMPOSITION AND HEAT TREATMENT~~	
~~CARBON-MANGANESE STEEL (Fully killed fine grain steel)~~	
~~Small additions of alloying elements by agreement with **TL.**~~	
~~Composition limits to be approved by **TL.**~~	
~~Normalized, or quenched and tempered. **(4)**~~	
~~TENSILE AND CHARPY V-NOTCH IMPACT TEST REQUIREMENTS~~	
~~SAMPLING FREQUENCY~~	
~~Plates~~	**~~Each "piece" to be tested.~~**
~~Sections and forgings~~	**~~Each "batch" to be tested.~~**
~~MECHANICAL PROPERTIES~~	
~~Tensile properties~~	~~Specified minimum yield stress not to exceed 410 N//mm^2 **(5)**~~

CHARPY V-NOTCH IMPACT TEST		
~~**Plates**~~	~~Transverse test pieces. Minimum average energy value (KV) 27J~~	
~~**Sections and forgings**~~	~~Longitudinal test pieces. Minimum average energy value (KV) 41J~~	
Test temperature	**Thickness t [mm]**	**Test temperature [°C]**
	40 < t ≤ ~~20~~ 50 (1)	**~~0~~ -20 (2)**
	~~20~~ ~~40~~ < t ≤ ~~40~~ 50 (~~3~~1)	**- ~~20~~30 (3)**

Notes:

(1) ~~*For seamless pipes and fittings, normal practice of **TL** applies. The use of longitudinally or spirally welded pipes shall be specially approved by **TL***~~ *A further set of impact test at mid thickness for products with t>40mm is required except rolled steels specified in TL-R W11 or W16.*

(2) ~~*Charpy V-notch impact tests are not required for pipes*~~ *Applies to type C independent tanks and process pressure vessels. In addition, post-weld stress relief heat treatment shall be performed. Exemption to post-weld stress relief heat treatment based on alternative approach (e.g. Engineering Critical Assessment) shall be approved by **TL** or shall be to recognized standards.*

(3) ~~*This table is generally applicable for material thicknesses up to 40mm. Proposals for greater thicknesses shall be approved by **TL***~~ *Applies to cargo tank or fuel tank other than type C.*

~~**(4)** *A controlled rolling procedure or TMCP may be used as an alternative.*~~

~~**(5)** *Materials with specified minimum yield stress exceeding 410 N/mm^2 may be specially approved by **TL**.*~~

~~*For these materials, particular attention shall be given to the hardness of the weld and heat affected zone.*~~

~~**Table 3.19 Plates, sections and forgings (1) for cargo tanks, secondary barriers (5) and process pressure vessels for design temperatures below 0°C and down to – 55°C. Maximum thickness 25mm. (2)**~~

~~CHEMICAL COMPOSITION AND HEAT TREATMENT~~					
~~CARBON-MANGANESE STEEL (Fully killed aluminium treated fine grain steel)~~					
~~Chemical composition (ladle analysis)~~					
~~**C**~~	~~**Mn**~~	~~**Si**~~	~~**S**~~	~~**P**~~	
~~**0,16 % max. (3)**~~	~~**0,70 – 1,60 %**~~	~~**0,10 – 0,50 %**~~	~~**0,025 % max.**~~	~~**0,025 % max.**~~	
~~**Optional additions :**~~	~~Alloys and grain refining elements may be generally in accordance with the following:~~				
~~**Ni**~~	~~**Cr**~~	~~**Mo**~~	~~**Cu**~~	~~**Nb**~~	~~**V**~~
~~**0,80 % max.**~~	~~**0,25 % max.**~~	~~**0,08 % max.**~~	~~**0,35 % max.**~~	~~**0,05 % max.**~~	~~**0,10 % max.**~~
~~Al content total 0,02% min (Acid soluble 0,015% min)~~					
~~Normalized or quenched and tempered **(4)**~~					
~~TENSILE AND CHARPY V-NOTCH IMPACT TEST REQUIREMENTS~~					
~~SAMPLING FREQUENCY~~					
~~**Plates**~~	~~**Each "piece" to be tested**~~				
~~**Sections and forgings**~~	~~**Each "batch" to be tested.**~~				
~~**MECHANICAL PROPERTIES**~~					
~~**Tensile properties**~~	~~Specified minimum yield stress not to exceed 410 N/mm^2 **(5)**~~				
~~CHARPY V-NOTCH IMPACT TEST~~					
~~**Plates**~~	~~Transverse test pieces. Minimum average energy value [KV] 27J~~				
~~**Sections and forgings (1)**~~	~~Longitudinal test pieces. Minimum average energy value [KV] 41J~~				
~~**Test temperature**~~	~~5°C below the design temperature or –20°C, whichever is lower~~				

~~**NOTES:**~~

~~**(1)** *The requirements of Charpy V-notch impact test and chemical composition for forgings may be specially considered.*~~

~~**(2)** *For material thickness more than 25mm, Charpy V-notch impact tests shall be conducted as follows:*~~

~~Material Thickness~~	~~Test Temperature~~
~~25 < t ≤ 30 mm~~	~~10°C below design temperature or –20 °C whichever is lower~~
~~30 < t ≤ 35 mm~~	~~15°C below design temperature or –20 °C whichever is lower~~
~~35 < t ≤ 40 mm~~	~~20°C below design temperature~~
~~40 mm < t~~	~~Temperature approved by **TL**~~

~~*The Charpy V-notch impact energy value shall be in accordance with the table for applicable type of test specimen.*~~

~~*Materials for tanks and parts of tanks which are completely thermally stress relieved after welding may be tested at a temperature 5°C below design temperature or –20°C, whichever is lower.*~~

~~*For thermally stress relieved reinforcements and other fittings, the test temperature shall be the same as that required for the adjacent tank shell thickness.*~~

~~**(3)** *By special agreement with **TL** the carbon content may be increased to 0,18% maximum provided the design temperature is not lower than –40°C.*~~

~~**(4)** *A controlled rolling procedure or TMCP may be used as an alternative.*~~

~~**(5)** *Materials with specified minimum yield stress exceeding 410 N/mm^2 may be approved by **TL**. For these materials, particular attention shall be given to the hardness of the weld and heat affected zones.*~~

~~***Guidance:***~~

~~*For materials exceeding 25 mm in thickness for which the test temperature is –60°C or lower, the application of specially treated steel or steels in accordance with Table 3.20 may be necessary.*~~

In addition to Part C, Chapter 10 Table 6.2 or Part D, Chapter 78 Table 7.2, the following applies:

Table 3.19a Plates, sections and forgings for cargo tanks, fuel tanks, secondary barriers and process pressure vessels for design temperatures below 0°C and strictly down to -10°C

CHARPY V-NOTCH IMPACT TEST		
Test temperature	**Thickness t [mm]**	**Test temperature [°C]**
	40 < t ≤ 50 (1)	**5°C below design temperature or –20°C, whichever is lower (2)**
	40 < t ≤ 45 (1)	**25 °C below design temperature(3)**
	45 < t ≤ 50 (1)	**30 °C below design temperature (3)**

Notes:

(1) *A further set of impact test at mid thickness for products with t>40mm is required except rolled steels specified in TL-R W11 or W16.*

(2) *Applies to type C independent tanks and process pressure vessels. In addition, post-weld stress relief heat treatment shall be performed. Exemption to post-weld stress relief heat treatment based on alternative approach (e.g. Engineering Critical Assessment) shall be approved by **TL** or shall be to recognized standards.*

(3) *Applies to cargo tank or fuel tank other than type C.*

Table 3.19b Plates, sections and forgings for cargo tanks, fuel tanks, secondary barriers and process pressure vessels for design temperatures below -10°C and down to -55°C

CHARPY V-NOTCH IMPACT TEST		
Test temperature	**Thickness t [mm]**	**Test temperature [°C]**
	40 < t ≤ 50 (1)	**5°C below design temperature or –20°C, whichever is lower (2)**
	40 < t ≤ 45 (1)	**25 °C below design temperature(3)**
	45 < t ≤ 50 (1)	**30 °C below design temperature (3)**

Notes:

(1) *A further set of impact test at mid thickness for products with t>40mm is required except rolled steels specified in TL-R W11 or W16.*

(2) *Part C, Chapter 10 item 6.6.2.2 applies with regards to post-weld stress relief heat treatment. Exemption to post-weld stress relief heat treatment based on alternative approach (e.g. Engineering Critical Assessment) shall be approved by **TL** or shall be to recognized standards.*

(3) *Applies to cargo tank or fuel tank other than type C.*

In addition to Part C, Chapter 10 Table 6.3 or Part D, Chapter 78 Table 7.3, the following applies:

Table 3.20 Plates, sections and forgings ~~(1)~~ for cargo tanks, fuel tanks, secondary barriers and process pressure vessels for design temperatures below – 55°C and down to – 165°C ~~(2). Maximum thickness 25 mm (3) (4)~~.

~~Minimum design temperature [°C]~~	~~Chemical composition **(5)** and heat treatment~~	~~Charpy V-notch impact test temperature [°C]~~
~~-60~~	~~1,5% nickel steel – normalized or normalized and tempered or quenched and tempered or TMCP **(6)**~~	**~~-65~~**
~~-65~~	~~2,25% nickel steel – normalized or normalized and tempered or quenched and tempered or TMCP **(6) (7)**~~	**~~-70~~**
~~-90~~	~~3,5% nickel steel – normalized or normalized and tempered or quenched and tempered or TMCP **(6) (7)**~~	**~~-95~~**
~~-105~~	~~5% nickel steel – normalized or normalized and tempered or quenched and tempered **(6) (7) (8)**~~	**~~-110~~**
~~-165~~	~~9% nickel steel – double normalized and tempered or quenched and tempered **(6)**~~	**~~-196~~**
~~-165~~	~~Austenitic steels such as stainless steels (e.g. types 304, 304L, 316, 316L, 321, and 347 Solution treated **(9)**)~~	**~~-196~~**
~~-165~~	~~Aluminium alloys (e.g. type 5083 Annealed)~~	**~~Not required~~**
~~-165~~	~~Austenitic Fe-Ni alloy (36% nickel) – Heat treatment as agreed~~	**~~Not required~~**

TENSILE AND CHARPY V-NOTCH IMPACT TEST REQUIREMENTS	
SAMPLING FREQUENCY	
Plates	**Each "piece" to be tested**
Sections and forgings	**Each "batch" to be tested.**
CHARPY V-NOTCH IMPACT TEST	
Plates	Transverse test pieces. Minimum average energy value [KV] 27J
Sections and forgings	Longitudinal test pieces. Minimum average energy value [KV] 41J

Notes:

(1) *The Charpy V-notch impact test required for forgings used in critical applications shall be subject to special consideration.*

(2) *The requirements for design temperatures below –165°C shall be specially agreed.*

(3) *For materials 1,5% Ni, 2,25% Ni, 3,5% Ni, and 5% Ni, with thickness greater than 25 mm, the Charpy V-notch impact tests shall be conducted as follows:*

Material thickness	Test temperature
2540 < t ≤ 3045 mm (1)	10 25°C below design temperature
3045 < t ≤ 3550 mm (1)	15 30°C below design temperature
35 < t ≤ 40 mm	20°C below design temperature

The Charpy V-notch impact energy value shall be in accordance with the table for the applicable type of test specimen. For material thickness of more than 40 mm, the Charpy V-notch impact energy values shall be specially considered

(4) *For 9% Ni steels, austenitic steels and aluminium alloys, thickness greater than 25 mm may be used.*

(5) *The chemical composition limits shall be approved by **TL.***

(6) *TMCP nickel steels will be subject to acceptance by **TL.***

(7) *A lower minimum design temperature for quenched and tempered steels may be specially agreed with **TL.***

(8) *A specially heat treated, 5% nickel steel, for example triple heat treated 5% nickel steel may be used down to –165°C upon special agreement with **TL**, provided that the Charpy V-notch impact tests are carried out at –196°C.*

(9) *The Charpy V-notch impact test may be omitted subject to agreement with **TL***

(1) *A further set of impact test at mid thickness for products with t>40mm is required except rolled steels specified in TL-R W11 or W16.*

Table 3.21 Pipes (seamless and welded) (1) , forgings (2) and castings (2) for cargo and process piping for design temperatures below 0°C and down to –165°C (3). Maximum thickness 25 mm.

Minimum design temperature [°C]	Chemical composition **(5)** and heat treatment	Charpy V-notch impact test temperature [°C]	Minimum average energy (KV) [J]
-55	Carbon-manganese steel – Fully killed fine grain. Normalized or as agreed **(6)**	**See Note 4**	**27**
-65	2,25% nickel steel – Normalized or normalized and tempered or quenched and tempered **(6)**	**-70**	**34**
-90	3,5% nickel steel – Normalized or normalized and tempered or quenched and tempered **(6)**	**-95**	**34**
-165	9% nickel steel **(7)** – Double normalized and tempered or quenched and tempered	**-196**	**41**
	Austenitic steels such as stainless steels (e.g. types 304, 304L, 316, 316L, 321, and 347 Solution treated **(8)**)	**-196**	**41**
	Aluminium alloys (e.g. type 5083 Annealed)		**Not required**

TENSILE AND CHARPY V-NOTCH IMPACT TEST REQUIREMENTS
SAMPLING FREQUENCY
Each "batch" to be tested
CHARPY V-NOTCH IMPACT TEST
CHARPY V-NOTCH IMPACT TEST: Longitudinal test pieces
Notes: ***(1)*** *The use of longitudinally or spirally welded pipes shall be specially approved by **TL**.* ***(2)*** *The requirements for forgings and castings may be subject to special consideration.* ***(3)*** *The requirements for design temperatures below -165°C shall be specially agreed.* ***(4)*** *The test temperature shall be 5°C below the design temperature or -20°C whichever is lower.* ***(5)*** *The chemical composition limits shall be approved by **TL**.* ***(6)*** *A lower design temperature may be specially agreed for quenched and tempered materials.* ***(7)*** *The chemical composition is not suitable for castings.* ***(8)*** *Charpy V-notch impact tests may be omitted subject to agreement with **TL**.*

Table 3.21a Plates and sections for hull structures required by Chapter 10, Section 4,D.19.

Minimum design temperature of hull structure [°C]	Maximum thickness [mm] for steel grades							
	TL-A	**TL-B**	**TL-D**	**TL-E**	**TL-AH**	**TL-DH**	**TL-EH**	**TL-FH**
0 and above **(1)** -5 and above **(2)**	**Normal practice**							
Down to -5	**15**	**25**	**30**	**50**	**25**	**45**	**50**	**50**
Down to -10	**x**	**20**	**25**	**50**	**20**	**40**	**50**	**50**
Down to -20	**x**	**x**	**20**	**50**	**x**	**30**	**50**	**50**
Down to -30	**x**	**x**	**x**	**40**	**x**	**20**	**40**	**50**
Below -30	In accordance with Table 3.19 except that the thickness limitation given in Table 3.19 and in note 2 of Table 3.19 does not apply.							
Notes: *"x" means steel grade not to be used.* **(1)** *For the purpose of Ch. 10, Section 4,D.19.* **(2)** *For the purpose of Ch. 10, Section 4,D.19.*								

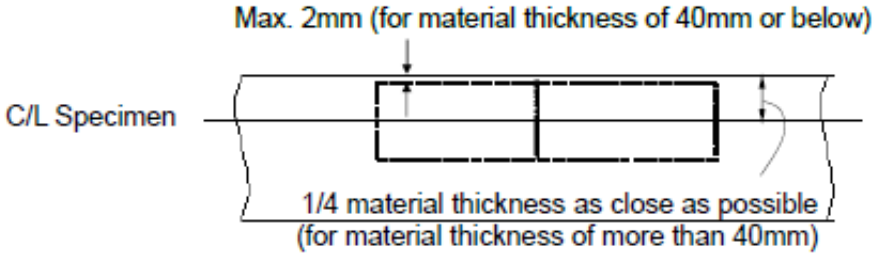
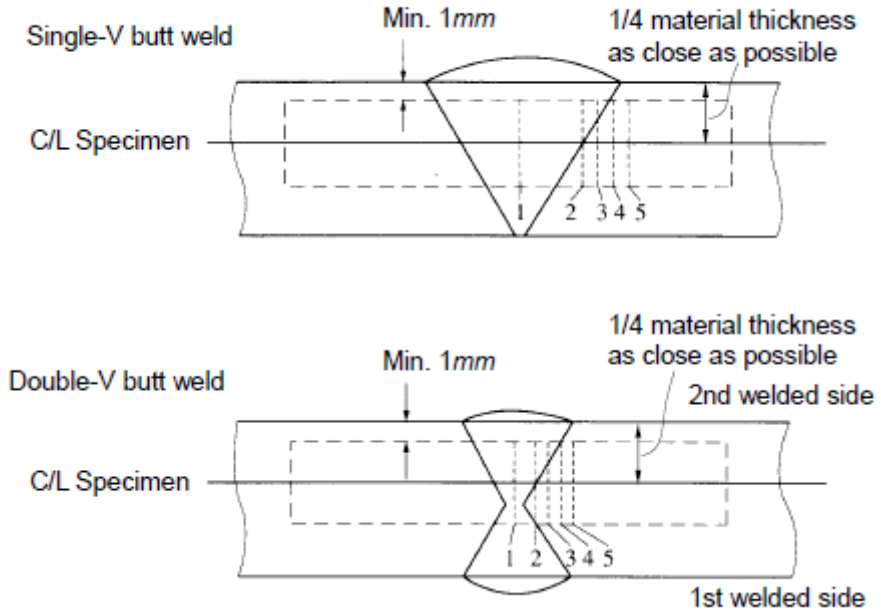


Figure 3.7a Sampling position of Charpy V-notch impact test specimens (Base metal)



~~**Figure 3.7b Sampling position of Charpy V-notch impact test specimens (Weld)**~~

~~**Notch location**~~

~~1 Centreline of the weld~~

~~2 Fusion line~~

~~3 In HAZ, 1mm from fusion line~~

~~4 In HAZ, 3mm from fusion line~~

~~5 In HAZ, 5mm from fusion line~~

PART A – CHAPTER 3 - WELDING

01. Section 12 – Welding of Hull Structures

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item J was revised according to UR W1 Rev.4 as below:

J. Welding Requirements for ~~Cargo Tanks of Gas Tankers~~Ships Carrying Liquefied Gases in Bulk and Ships Using Gases or Other Low-flashpoint Fuels

~~**1. Welding and Non-destructive Testing**~~

~~**1.1 General**~~

~~This sub-section shall apply to primary and secondary barriers only, including the inner hull where this forms the secondary barrier. The requirements listed herein are those generally employed for carbon, carbon-manganese, nickel alloy and austenitic stainless steels, aluminium alloy and may form the basis for acceptance testing of other material. At the discretion of **TL**, Charpy V-notch impact testing of austenitic stainless steels and aluminium alloy weldments may be omitted and other tests may be specially required for any material.~~

~~**1.2 Welding consumables**~~

~~Welding consumables intended for welding of cargo tanks shall be approved by **TL.**~~
~~Deposited weld metal tests and butt weld tests shall be required for all welding consumables, unless specially agreed otherwise. The results obtained from tensile and Charpy V-notch impact tests shall be approved by **TL.** The chemical composition of the deposited weld metal shall be reported for information and approval.~~

~~**1.3 Welding procedure tests for cargo tanks and process pressure vessels**~~

~~**1.3.1 Number and orientation of test assemblies**~~

~~Welding procedure tests for cargo tanks and process pressure vessels are required for all butt welds. The test assemblies shall be representative of the following:~~

~~(i) Each base material~~

~~(ii) Each type of consumable and welding process~~

~~(iii) Each welding position~~

~~For butt welds in plates, the test assemblies shall be so prepared that the rolling direction is parallel to the direction of welding. The range of thickness qualified by each welding procedure test shall be approved by **TL.** Radiographic or ultrasonic testing may be performed at the option of the fabricator or **TL**.~~

~~**1.3.2 Required tests**~~

~~The following welding procedure tests for cargo tanks and process pressure vessels shall be carried out in accordance with Chapter 2, Section 3,E.2, with the specimens made from each test assembly:~~

~~(i) Cross-weld tensile tests~~

~~(ii) Longitudinal all-weld tensile testing, where required by **TL.**~~

~~(iii) Transverse bend tests: which may be face, root or side bends at the discretion of **TL**. However, longitudinal bend tests may be required in lieu of transverse bend tests in cases where the base material and weld metal have different strength levels.~~

~~(iv) One set of three Charpy V-notch impact test specimens, generally at each of the following indications (see Fig. 12.38):~~
~~(1) Centre line of the welds~~
~~(2) Fusion line (F.L.)~~
~~(3) 1mm from the F.L.~~
~~(4) 3mm from the F.L.~~
~~(5) 5mm from the F.L.~~

~~(v) Macrosection, microsection and hardness survey may also be required at the discretion of **TL.**~~

~~**1.4 Test requirements**~~

~~**1.4.1 Tensile tests**~~

~~Generally tensile strength shall not to be less than the specified minimum tensile strength for the appropriate parent materials. It may also be accepted subject to agreement with **TL** that the transverse weld tensile strength is not to be less than the specified minimum tensile strength for the deposited metal, where the weld metal has lower tensile strength than that of the parent metal. In every case, the position of fracture shall be reported for information.~~

~~**1.4.2 Bend tests**~~

~~No fracture is acceptable after 180° bend over a former diameter of 4t where t is the thickness of the test pieces.~~

~~**1.4.3 Charpy V-notch impact tests**~~

~~Charpy V-notch impact test shall be conducted at the temperature prescribed for the base material being joined. The results of weld metal Charpy V-notch impact tests, minimum average energy (KV), shall be no less than 27J. The weld metal requirements for subsize specimens and single energy values shall be in accordance with Chapter 2, Section 3,E.2.2. The results of fusion line and heat affected zone Charpy V-notch impact tests, shall show a minimum average energy (KV), are to be generally in accordance with the transverse or longitudinal requirements of the base material whichever is applicable, and for subsize specimens, the minimum average energy (KV), in accordance with Chapter 2, Section 3,E.2.2. If the material thickness does not permit machining either full size or standard subsize specimens, the testing procedure and acceptance standards shall be approved by **TL**.~~

~~**1.5 Fillet welding procedure tests**~~

~~Fillet welding procedure tests shall be in accordance with the Rules of **TL.** In such cases, welding consumables shall be selected which exhibit satisfactory Charpy V-notch impact properties.~~

~~**1.6 Welding procedure tests for secondary barriers**~~

~~Welding procedure tests for secondary barriers shall be in accordance with the Rules of **TL.**~~

~~**1.7 Welding procedure tests for piping**~~

~~Welding procedure tests for piping are required and shall be similar to those detailed for cargo tanks provided in 1.3. Unless specially agreed otherwise the test requirements shall be in accordance with 1.4.~~

~~**1.8 Production weld tests**~~

~~For all cargo tanks and process pressure vessels except for integral and membrane tanks, production tests shall generally be performed for approximately each 50 m of butt weld joints and shall be representative of each welding position. For secondary barriers, the same type production tests as required for primary tanks shall be performed except that the number of tests may be reduced subject to the agreement with **TL**. Tests, other than those specified, may be required for cargo tanks or secondary barriers at the discretion of **TL.** Test requirements shall be in accordance with 1.4.~~

~~The quality assurance/quality control programme shall ensure the continued conformity of the production welds as defined in the material manufacturer's quality manual.~~

~~**1.8.1 Type A and type B independent tanks and semi-membrane tanks**~~

~~The production tests for type A and type B independent tanks and semi-membrane tanks shall include the following tests:~~
~~Bend tests and, where required for procedure tests, one set of three Charpy V-notch impact tests shall be made for each 50 m of weld.~~

~~The Charpy V-notch impact tests shall be made with specimens having the notch alternately located in the centre of the weld and in the heat affected zone (most critical location based on procedure qualification results). For austenitic steels, all notches shall be in the centre of the weld.~~

~~**1.8.2 Type C independent tanks and process pressure vessels**~~

~~In addition to those tests listed in 1.8.1, for type C independent tanks and process pressure vessels, transverse weld tensile tests are also required.~~

~~**1.8.3 Integral and membrane tanks**~~

~~The test requirements for integral and membrane tanks are the same as the applicable test requirements listed in 1.3.~~

~~**1.9 Non-destructive testing**~~

~~All test procedures and acceptance standards shall be in accordance with **TL**, unless the designer specifies a higher standard in order to meet design assumptions. Radiographic testing shall be used, in principle, to detect internal defects. However, an approved ultrasonic test procedure in lieu of radiographic testing may be conducted, but, in addition, supplementary radiographic testing at selected locations shall be carried out to verify the results. Radiographic and ultrasonic testing records shall be retained. The quality assurance/quality control programme shall ensure the continued conformity of the non-destructive testing of welds, as defined in the material manufacturer's quality manual.~~

~~**1.9.1 Type A and B independent tanks and semi-membrane tanks**~~

~~(i) For type A independent tanks and semi-membrane tanks where the design temperature is equal to or lower than –20°C, and for type B tanks, regardless of temperature, all full penetration butt welds of the shell plating of cargo tanks shall be subjected to non-destructive testing suitable to detect internal defects over their full length. Ultrasonic testing in lieu of radiographic testing may be carried out under the same conditions as described in the first paragraph of 1.9.~~

~~(ii) For type A independent tanks and semi-membrane tanks, where the design temperature is higher than –20°C, all full penetration butt welds in way of intersections and at least 10% of the remaining full penetration butt welds of tank structures shall be subjected to radiographic testing or ultrasonic testing under the same conditions as described in the first paragraph of 1.9.~~

~~(iii) In each case, the remaining tank structure, including the welding of stiffeners and other fittings and attachments, shall be tested by magnetic particle or dye penetrant methods, as considered necessary by **TL.**~~

~~**1.9.2 Type C independent tanks and process pressure vessels**~~

~~Inspection of type C independent tanks and process pressure vessels shall be carried out in accordance with Chapter 10, Section 6.5.~~

~~**1.9.3 Integral and membrane tanks**~~

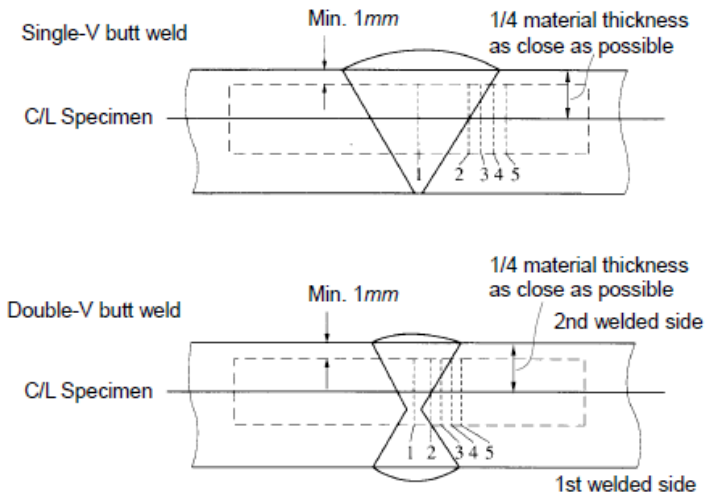
~~Special weld inspection procedures and acceptable standards shall be submitted by the designers of integral and membrane tanks for approval by TL.~~

~~**1.9.4 Piping**~~

~~Inspection of piping is to shall be carried out in accordance with Chapter 10, Section 5.~~

~~**1.9.5 Secondary barriers**~~

~~The secondary barrier shall be non-destructive tested for internal defects as considered necessary. When the outer shell of the hull is part of the secondary barrier, all sheerstrake butts and the intersections of all butts and seams in the side shell shall be tested by radiographic testing.~~



~~**Figure 12.38 Sampling position of Charpy V-notch impact test specimens (Weld)**~~

~~**Notch location**~~

~~1 Centreline of the weld~~

~~2 Fusion line~~

~~3 In HAZ, 1mm from fusion line~~

~~4 In HAZ, 3mm from fusion line~~

~~5 In HAZ, 5mm from fusion line~~

Part C, Chapter 10, Section 6 shall be applied for welding requirements.

02. Annex C – Applicable Sections for Bulk Carriers and Double Hull Oil Tankers with CSR Notation

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Table was revised according to UR W1 Rev.4 as below:

……

Sub-section	Paragraph	Applicable to CSR Vessels	Remarks
SECTION 12 - WELDING OF HULL STRUCTURES			
G. DESIGN, DIMENSIONING	1. General	Y	
	2. Characteristics Related to Materials, Corrosion	Y	
	3. Stress Flow, Transitions	Y	
	4. Local Clustering of Welds, Minimum Spacing, Socket Weldments	Y	
	5. Welding Apertures	Y	
	6. Local Reinforcements, Plate Doublings	Y	
	7. Transverse Members, Stress in the Thickness Direction	Y	
	8. Welding of Cold-Formed Sections, Bending Radii.	Y	
	9. Build-up Welds on Rudderstocks and Pintles	Y	
	10. Weld Shapes and Dimensions	N	
	11. Welding at the Ends of Girders and Stiffeners	Y	
	12. Joints Between Section Ends and Plates	Y	
	13. Welded Shaft Bracket Joints	Y	
	14. Rudder Coupling Flanges	Y	
	15. Design Calculations Applied to Welded Joints	Y	
H. EXECUTION OF WELDS		Y	
I. INSPECTION OF WELDED JOINTS		Y	
J. WELDING REQUIREMENTS FOR ~~CARGO TANKS OF GAS TANKERS~~ SHIPS CARRYING LIQUEFIED GASES IN BULK AND SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS		~~N~~Y	As applicable

PART B – CHAPTER 4 MACHINERY

01. Section 01 – General Rules and Instructions

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item A.1.9 in Section 1 of Chapter 4 were deleted according to UR M69 Del as below:

~~**1.9 All passenger ships shall comply with TL-R M69.**~~

02. Section 02 – Internal Combustion Engines and Air Compressors

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Footnote 5 under the Table 2.1 in Section 2 of Chapter 4 was revised according to UR M44 Rev.10 Corr.1 as below:

(5) *And the system, where this is supplied by the engine manufacturer. Where engines rely on hydraulic, pneumatic or electronic control of fuel injection and/or valves, a failure mode and effects analysis (FMEA) is to be submitted to demonstrate that failure of the control system will not result in the operation of the engine being degraded beyond acceptable performance criteria for the engine. ~~The FMEA reports required will not be explicitly approved by **TL**.~~ For FMEA process of diesel engine control systems see TL- G 138.*

……

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Table 2.2, footnote 7 under the Table 2.1 and footnotes 10, 11 under the Table 2.3 in Section 2 of Chapter 4 was revised according to UR M44 Rev.10 as below:

(7) *According to TL- R M44 ~~Rev.9~~, "Internal Combustion Engine Approval Application Form and Data Sheet" should be filled and submitted to **TL***

……

Table 2.2 Documentation to be submitted for approval, as applicable

No.	Item	Quantity
1	Bedplate and crankcase of welded design, with welding details and welding Instructions **(1) (2)**	3
2	Thrust bearing bedplate of welded design, with welding details and welding instructions **(1)**	3
3	Bedplate/oil sump welding drawings **(1)**	3
4	Frame/framebox/gearbox of welded design, with welding details and instructions**(1) (2)**	3
5	Engine frames, welding drawings **(1) (2)**	3
6	Crankshaft, details, each cylinder No.	3
7	Crankshaft, assembly, each cylinder No.	3

8	Crankshaft calculations (for each cylinder configuration) according to the TL-R M44 ~~Rev.9~~ Appendix 3 and TL- R M53.	3
9	Thrust shaft or intermediate shaft (if integral with engine)	3
10	Shaft coupling bolts	3
11	Material specifications of main parts with information on non-destructive material tests and pressure tests **(3)**	3

……

(10) *Documents modified for a specific application are to be submitted to* ***TL*** *for information or approval, as applicable. See TL-R M44 ~~Rev.9~~ Item 3.2.2.2, Appendix 4 and Appendix 5.*
(11) *According to TL- R M44 ~~Rev.9~~, Appendix 3 - "Internal Combustion Engine Approval Application Form and Data Sheet" should be filled and submitted to* ***TL***.

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item M.5.4.3 in Section 2 of Chapter 4 was added according to UR M81 New as below:

5.4.3 For detailed requirements in respect of safety measures against chemical treatment fluids used for exhaust gas cleaning systems and the residues which have hazardous properties, see **TL** Guidelines for Exhaust Gas Cleaning Systems,item C10.

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items O.1.2.11, O.1.2.13, O.2.2.8, O.3.1.1, O.4.1.4, O.4.2.1 and O.4.3 were revised in Section 02 of Chapter 4 according to UR M78 Rev.1 as below:

O. Safety of Internal Combustion Engines Supplied with Low Pressure Gas (up to 10 bar)

1. General

……

1.2.11 IGC Code means the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (as amended by IMO Resolutions MSC.370(93)), MSC.411(97) and MSC.441(99)).

1.2.12 IMO means the International Maritime Organisation

1.2.13 IGF Code means the International Code of Safety for Ships Using Gases or other Low-Flashpoint Fuels (IMO Resolution MSC.391(95)) , as amended by Resolution MSC.422(98)).

……

2.2.8 Gas admission valves

Gas admission valves shall be certified safe as follows:

……

However, if they are not rated for the zone they are intended for, it shall be documented that they are suitable for that zone. Documentation and analysis is to be based on IEC 60079-10- 1:2015 or IEC 60092-502:1999.

……

3. Specific Design Requirements

3.1 DF Engines

3.1.1 General

……

For the application of 4.1.4, 4.2.1 and 4.3 referring to E.3.5, E.4.3.3 and E.4.4.4, the 110% load tests are not required in the gas mode for DF engines.

……

4.1.4 Test programme

……

~~The 110% load tests are not required in the gas mode.~~

……

4.2 Factory Acceptance Test

4.2.1 General

……

For DF engines, the load tests referred to in E.4.3.3 are to be carried out in gas mode at the different percentages of the maximum power available in gas mode (see 3.1.1). ~~The 110% load test is not required in the gas mode.~~

……

4.3 Shipboard Trials

Shipboard trials are to be carried out in accordance with the provisions of E.4.4.

For DF engines, the test loads required in E.4.4.4 are to be carried out in all operating modes (gas mode, diesel mode, etc.).

For DF engines, the load tests referred to in E.4.4.4 are to be carried out in gas mode at the different percentages of the maximum power available in gas mode (see 3.1.1).

03. Section 05 – Main Shafting

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items B.2.2.1 and B.2.3 in Section 5 of Chapter 4 were revised according to UR M68 Rev.3 as below:

2.2.1 Test conditions

Test conditions are to be in accordance with Table 5.1. Mean surface roughness is to be <0.2 μ m Ra with the absence of localised machining marks verified by visual examination at low magnification (x20) as required by Section 8.4 of ISO 1352:2011.

Test procedures are to be in accordance with Section 10 of ISO 1352:2011.

……

2.3 Cleanliness requirements

The steels are to have a degree of cleanliness as shown in Table 5.2 when tested according to ISO 4967:2013 method A. Representative samples are to be obtained from each heat of forged or rolled products.

04. Section 07 – Gears, Couplings

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items C.5.3, C.5.4, C.5.5, C.6.11, C.6.12, C.6.13.3, C.7.1, C.7.2.3, C.7.2.4, C.7.2.8 and C.7.2.10 were revised according to UR M56 Rev.4 and Table 7.4 was revised according to UR M56 Rev.4 Corr.1 as below:

5.3 Internal dynamic factor K_v

……

For gears other than the above, reference is to be made to Method B outlined in the reference standard ISO 6336-1:2019.

……

Table 7.4 Values of the factor K_1 for the calculation of K_v

	K_1 ISO accuracy grades **(1)**					
	3	4	5	6	7	8
spur gears	2.1	3.9	7.5	14.9	26.8	39.1
helical gears	1.9	3.5	6.7	13.3	23.9	34.8

(1) *ISO accuracy grades according to ISO 1328-2:2020. In case of mating gears with different accuracy grades, the grade corresponding to the lower accuracy should be used.*

……

5.4 Face load distribution factors $K_{H\beta}$ and $K_{F\beta}$

……

The face load distribution factors, $K_{H\beta}$ for contact stress, $K_{F\beta}$ for tooth root bending stress, are to be determined according to the method C outlined in the ISO 6336-1:2019 standard.

……

5.5 Transverse load factors $K_{H\alpha}$ and $K_{F\alpha}$

……

The load distribution factors, $K_{H\alpha}$ and $K_{F\alpha}$ are to be advised by the manufacturer as supported by his measurements, analysis or experience data or are to be determined according to the Method B outlined in the ISO 6336-1:2019 standard:

……

6.11 Endurance limit for contact stress,σ_{HIi}

……

The σ_{Hlim} values correspond to a failure probability of 1% or less. Endurance limit for contact stress σ_{Hlim} is to be determined, in general, making reference to values indicated in ISO 6336-5:2016, for material quality M_Q

……

6.12 Life factor, Z_N

……

The life factor, Z_N, is to be determined according to method B outlined in the ISO 6336-2:2019 standard.

……

6.13.3 Roughness factor, Z_R

……

The peak-to-valley roughness determined for the pinion R_{z1} and for the wheel R_{z2} are mean values for the peak-to-valley roughness R_z measured on several tooth flanks (R_z as defined in the ISO 6336-2:2019)

……

7.1 Scope and general remarks

……

- For larger pressure angles and large helix angles, the calculated results should be confirmed by experience as by method A of ISO 6336-3:2019.

……

7.2.3. Tooth form factor, Y_F, $Y_{F\alpha}$

……

For the calculation of h_F, s_{Fn} and α_{Fen}, the procedure outlined in ISO 6336-3:2019 (Method B) is to be used.

……

7.2.4 Stress correction factor, Y_S, Y_{Sa}

……

For the calculation of ρ_F the procedure outlined in ISO 6336-3:2019 is to be used.

……

7.2.8 Bending endurance limit, σ_{FE}

For a given material, σ_{FE} is the limit of repeated tooth root stress that can be sustained. For most materials, their stress cycles may be taken at $3x10^6$ as the beginning of the endurance limit according to the reference standard ISO 6336-5:2016, unless otherwise specified.

……

7.2.10 Life factor, Y_N

……

The life factor, Y_N, is to be determined according to Method B outlined in ISO 6336-3:2019 standard.

05. Section 09 – Steering Gears and Thrusters

Revision Date: April 2022

Entry into Force Date: 1 July 2022

Items A.1.1 and A.6 were revised and item A.3.19.2 was deleted according to UR M42 Rev.5 & Rev.5 Corr.1. In addition, A 1.3.7 was revised to add a reference to Section 10, A as below:

A. Steering Gears

1. General

1.1 Scope

……

The requirements set out in ~~1974 SOLAS Chapter II-1, Regulation 29 and 30~~ SOLAS II-1/29 and SOLAS II-1/30, are integral part of this rule and are to be applied in their full extent.

……

1.3.7 Rudder actuator

……

Rudder actuators other than those covered by SOLAS Chapter II-1, Regulation 29.17 and relating Guidelines should be designed in accordance with Class 1 Pressure Vessels (not withstanding any exemptions for hydraulic cylinders).

For hydraulic cylinders, refer also to Section 10, A.

……

~~**3.19.2** Existing vessels according to SOLAS 1986 shall have minimum the above signboard, when applicable.~~

……

6. Shipboard Trials

The operational efficiency of the steering gear is to be proved during the sea trials. For this purpose, the Z manoeuvre corresponding to 3.2.1.2 and 3.3.1.2 is to be executed as a minimum requirement.

……

The alarms and indicators required by ~~the requirements in~~ SOLAS II-1/29 and SOLAS II-1/30 as well as 3.18 ~~and by SOLAS II-1 Regulations 29, 30~~, these tests may be effected at dockside.

06. Section 10 – Hydraulic Systems, Fire Doors and Stabilizers

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item A 1.3 and 1.5 were revised to clarify buckling check of hydraulic cylinders as below:

……

1.3 Documents for approval

The diagram of the hydraulic system together with drawings and buckling calculation of the cylinders and/or hydraulic motors containing all the data necessary for assessing the system, e.g. operating data, descriptions, materials used etc., are to be submitted in triplicate or in TL Electronic Approval System (TL - EPAS) for approval.

……

1.5 Dimensioning

See Section 14 for the design of pressure vessels, see Section 16 for the dimensions of pipes and hose assemblies.

Buckling calculations (e.g. rams, connecting rods, piston rods) are to be performed in accordance with a recognized standard accepted by **TL**.

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

Revision Date: April 2022

Entry into Force Date: 1 July 2022

Item B.2.6 and Table 16.2 was revised according to UR P4 Rev.6 as below:

2.6.1 Material properties and manufacturing methods of plastic pipes to be used for marine applications (refer also TL-R P4.5) are to be approved by **TL** ~~to be used for marine applications~~. Plastics pipes are produced of following material compositions, separately or combined:

……

2.6.5.2 External pressure

(for any installation which may be subject to vacuum conditions inside the pipe or a head of liquid acting on the outside of the pipe; and for any pipe installation required to remain operational in case of flooding damage, as per Regulation ~~II-1/8-1~~ of SOLAS ~~1974 Convention~~ Chapter II-1, as amended by IMO resolutions up to MSC.436(99), or for any pipes that would allow progressive flooding to other compartments through damaged piping or through open ended pipes in the compartments).

……

2.6.7 Temperature

Plastic piping system shall meet the design requirements of these guidelines over the range of service temperatures it will experience.

The minimum heat distortion/deflection temperature ~~should not~~ is to be not less than 80°C. This minimum heat distortion temperature requirement is not applicable to pipes and pipe components made of thermoplastic materials, such as polyethylene (PE), polypropylene (PP), polybutylene (PB) and intended for nonessential services.

~~The maximum working temperature should~~The permissible working temperature depending on the working pressure is to be in accordance with Manufacturer's recommendations, but in each case it is to be at least 20°C lower than the minimum heat distortion/deflection temperature of the pipe material, ~~(~~determined according to ISO 75-2:2013 method A, or equivalent, e.g ASTM D648-18~~) of the resin or plastic material~~.

Where low temperature services are considered, special attention is to be given with respect to material properties.

2.6.8 Fire endurance

2.6.8.1 Pipes and their associated fittings whose integrity is essential to the safety of ships, including plastic piping required by ~~SOLAS II-2,~~ Regulation~~.~~ 21.4 of SOLAS Chapter II-2 as amended by IMO Resolutions up to MSC.421(98) (hereinafter the same) to remain operational after a fire casualty, are required to meet the minimum fire endurance requirements of Appendix 1 or 2, as applicable, of IMO Resolution A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95).

2.6.8.2 Depending on the capability of a piping system to maintain its strength and integrity, there exist three different levels of fire endurance for piping systems.

2.6.8.2.1 Level 1. Piping having passed the fire endurance test specified in Appendix 1 of IMO Resolution~~.~~ A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95) for a duration of a minimum of one hour without loss of integrity in the dry condition is considered to meet level 1 fire endurance standard (L1). Level 1W – Piping systems similar to Level 1 systems except these systems do not carry flammable fluid or any gas and a maximum 5% flow loss in the system after exposure is acceptable (L1W).

2.6.8.2.2 Level 2. Piping having passed the fire endurance test specified in Appendix 1 of IMO Resolution~~.~~ A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95) for a duration of a minimum of 30 minutes in the dry condition is considered to meet level 2 fire endurance standard (L2).

Level 2W – Piping systems similar to Level 2 systems except a maximum 5% flow loss in the system after exposure is acceptable (L2W).

2.6.8.2.3 Level 3. Piping having passed the fire endurance test specified in Appendix 2 of IMO Resolution~~.~~ A.753 (18) as amended by IMO Resolutions MSC.313(88) and MSC.399(95) for a duration of a minimum of 30 minutes in the wet condition is considered to meet level 3 fire endurance standard (L3).

2.6.8.3 Permitted use of piping depending on fire endurance, location and piping system is given in Table 16.2 "Fire Endurance Requirement Matrix".

2.6.8.4 For Safe Return to Port purposes (~~SOLAS II-2, Reg.21.4~~Regulation. 21.4 of SOLAS Chapter II-2), plastic piping can be considered to remain operational after a fire casualty if the plastic pipes and fittings have been tested to L1 standard.

……..

Table 16.2 Fire endurance requirement matrix for different piping systems

……..

Abbreviations

L1 Fire endurance test (appendix 1) of IMO Resolution A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95)) in dry conditions, 60 min.

L1W Fire endurance test (item B.2.6.8.2)

L2 Fire endurance test (appendix 1) of IMO Resolution A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95)) in dry conditions, 30 min.

L2W Fire endurance test (item B.2.6.8.2)

L3 Fire endurance test (appendix 2) of IMO Resolution A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95)) in wet conditions, 30 min.

……..

Location

A Machinery spaces of Category A

B Other machinery spaces and pump rooms

……..

For location definitions see TL-R P4.

Footnotes:

(1) *Where non-metallic piping is used, remotely controlled valves to be provided at ship's side. These valves are to be*

controlled from outside the space.

(2) *Remote closing valves to be provided at the cargo tanks.*

(3) *When cargo tanks contain flammable liquids with a flash point >60ºC. "O" may replace "NA" or "X".*

(4) *For drains serving only the space concerned, "O" may replace" L1W".*

(5) *When controlling functions are not required by statutory requirements or guidelines, "O" may replace "L1".*

(6) *For pipe between machinery space and deck water seal, "O" may replace "L1".*

(7) *For passenger vessels, "X" is to replace "L1".*

(8) *Scuppers serving open decks in positions 1 and 2, as defined in ~~r~~Regulation 13 of Protocol of 1988 relating to the International Convention on Load Lines, 1966, as amended by IMO Resolutions up to MSC.375(93), should be "X" throughout unless fitted at the upper end with the means of closing capable of being operated from a position above the freeboard deck in order to prevent downflooding.*

(9) *For essential services, such as fuel oil tank heating and ship's whistle, "X" is to replace "O".*

(10) *For tankers where compliance with paragraph 3.6 of regulation 19 of ~~Annex I of~~ MARPOL ~~73/78~~ Annex I, as amended~~,~~ by IMO Resolutions up to MEPC.314(74) is required, "NA" is to replace "0".*

(11) *L3 in service spaces, NA in accommodation and control spaces.*

(12) *Type Approved plastic piping without fire endurance test (0) is acceptable downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire.*

(13) *For Passenger Ships subject to ~~SOLAS II-2, Reg.21.4~~ Regulation. 21.4 of SOLAS Chapter II-2 (Safe return to Port), plastic pipes for services required to remain operative in the part of the ship not affected by the casualty thresholds, such as systems intended to support safe areas, are to be considered essential services. In accordance with ~~MSC Circular~~ MSC.1/Circ.1369, interpretation 12, for Safe Return to Port purposes, plastic piping can be considered to remain operational after a fire casualty if the plastic pipes and fittings have been tested to L1 standard.*

……

2.6.17 Flame spread

2.6.17.1 All pipes, except those fitted on open decks and within tanks, cofferdams, void spaces, pipe tunnels and ducts if separated from accommodation, permanent manned areas and escape ways by means of an A class bulkhead are to have low surface flame spread characteristics not exceeding average values listed in Appendix 3 of IMO Resolution A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95).

2.6.17.2 Surface flame spread characteristics are to be determined using the procedure given in the 2010 FTP Code, Annex 1, Part 5 with regard to the modifications due to the curvilinear pipe surfaces as also listed in Appendix 3 of IMO Resolution A.753(18), as amended by IMO Resolutions~~.~~ MSC. 313(88) and ~~IMO Res.~~ MSC. 399(95).

2.6.17.3 Surface flame spread characteristics may also be determined using the test procedures given in ASTM D635-18, or in other national equivalent standards.

Under the procedure of ASTM D635-18 a maximum burning rate of 60 mm/min applies. In case of adoption of other national equivalent standards, the relevant acceptance criteria are to be defined.

……

2.6.22 Penetrations of fire divisions

Where "A" or "B" class divisions are penetrated for the passage of plastic pipes, arrangements are to be made to ensure that the fire resistance is not impaired. These arrangements are to be tested in accordance with Recommendations for fire test procedures for "A" "B" and "F" bulkheads specified in Part 3 of Annex 1 to the 2010 FTP Code~~, annex 1, part 3~~ (Resolution MSC.307(88) as amended by Resolution MSC.437(99)).

……..

2.6.30.3 Testing

Testing is to demonstrate compliance of the pipes, fittings and joints for which Type Approval is sought with item 2.6.

Pipes, joints and fittings are to be tested for compliance with the requirements of standards* acceptable to **TL.**

***** For the lists of standards refer to Guideline TL-G 86.

Revision Date: April 2022

Entry into Force Date: 1 July 2022

Item D.1.6 was revised according to UR P2.13 Rev.1; item D.2.4.4 and table 16.20 were revised according to UR P2.7.4 Rev.10 and table 16.21 was revised according to UR P 2.7.4 as below:

1.6 Protection from mechanical damage

Seawater pipes ~~located~~ in cargo holds for dry cargoes, including cargo spaces of container ships, ro-ro ships, ~~and in other spaces where pipes may be subject to impacts (e.g. fish holds, chain lockers)~~ are to be protected from impact of cargo where they are liable to be damaged ~~mechanical damage~~.

……..

2.4.4 The use of slip-on joints is not permitted in:

……..

~~Slip-on joints inside tanks may be permitted only if the pipes and tanks contain a same medium.~~ Slip-on joints are not to be used in pipelines in cargo holds, tanks and other spaces which are not easily accessible (refer to MSC/Circ.734), except that these joints may be permitted in tanks that contain the same media.

Usage of slip type slip-on joints as the main means of pipe connection is not permitted except for cases where compensation of axial pipe deformation is necessary.

……..

Table 16.1 Application of mechanical joints

The following table indicates systems where the various kinds of joints may be accepted. However, in all cases, acceptance of the joint type is to be subject to approval for the intended application, and subject to conditions of the approval and applicable Rules. Further, relevant statutory requirements must be taken into consideration. In cases exposure time (t_T) is greater than 30 minutes the dry-wet test conditions are 8 minutes dry and, accordingly, the wet period t_T-8 min.

Systems	Kind of connections				
	Pipe Unions	Compression couplings ~~(6)~~	Slip-on joints	Classifi-cation of pipe system	Fire endurance test condition[7]
Flammable fluids (flash points < ≤ 60°C)					
Cargo oil lines [4] [1]	+	+	+	dry	30 min dry (*)
Crude oil washing lines[4]	+	+	+	dry	
Vent lines [3]	+	+	+	dry	

Inert Gas					
Water seal effluent lines	+	+	+	wet	30 min wet (*)
Scrubber effluent lines	+	+	+	wet	30 min wet (*)
Main lines[2~~1~~&2~~4~~]	+	+	+	dry	30 min dry (*)
Distributions lines[4 1]	+	+	+	dry	30 min dry (*)
Flammable fluids (Flash point > 60°C)					
Cargo oil lines[4 1]	+	+	+	dry	30 min dry (*)
Fuel oil lines[2,~~&~~3]	+	+	+	wet	30 min wet (*)
Lubricating oil lines[2,~~&~~3]	+	+	+	wet	
Hydraulic oil[2,~~&~~3]	+	+	+	wet	
Thermal oil[2,~~&~~3]	+	+	+	wet	
Sea Water					
Bilge lines[~~1~~ 4]	+	+	+	dry/wet	8 min dry + 22 min wet (*)
~~Water filled fire extinguishing systems, e.g. sprinkler systems~~ Permanent water filled fire extinguishing systems, e.g. fire main, sprinkler systems[3]	+	+	+	wet	30 min wet (*)
Non-permanent water filled fire extinguishing systems, e.g. foam, drencher systems and fire main[3]	+	+	+	dry/wet	8 min dry + 22 min wet (*) For foam systems FSS Code Chapter 6 to be observed
Ballast system[~~1~~ 4]	+	+	+	wet	30 min wet (*)
Cooling water system[~~1~~ 4]	+	+	+	wet	30 min wet (*)
Tank cleaning services	+	+	+	dry	Fire endurance test not required
Non-essential systems	+	+	+	dry dry/wet wet	Fire endurance test not required
Fresh water					
Cooling water system[~~1~~4]	+	+	+	wet	30 min wet (*)
Condensate return[~~1~~4]	+	+	+	wet	30 min wet (*)
Non-essential system	+	+	+	dry dry/wet wet	Fire endurance test not required
Sanitary/Drains/Scuppers					
Deck drains (internal) [~~6~~5]	+	+	+[4]	dry	Fire endurance test not required
Sanitary drains	+	+	+	dry	
Scuppers and discharge (overboard)	+	+	-	dry	
Sounding / Vent					
Water tanks/ Dry spaces	+	+	+	dry, wet	Fire endurance test not required
Oil tanks (F.p. > 60°C)[2,~~&~~3]	+	+	+	dry	
Miscellaneous					
Starting /Control air[~~1~~4]	+	+	-	dry	30 min dry (*)

Service air (non-essential)	+	+	+	dry	Fire endurance test not required
Brine	+	+	+	wet	
CO_2 system~~1~~ (outside protected space)	+	+	-	dry	30 min dry (*)
CO_2 system (inside protected space)	+	+	-	dry	Mechanical joints shall be constructed of materials with melting point above 925°C. Ref. to FSS Code Chapter 5.
Steam	+	+	+~~5~~6	wet	Fire endurance test not required

Abbreviations:

\+ *Application is allowed*

\- *Application is not allowed*

* *Fire endurance test as specified in TL-R P2.11.5.5.6*

Footnotes Table 16.20 – Fire resistance capability

If mechanical joints include any components which readily deteriorate in case of fire, the following footnotes are to be observed:

1. ~~*Inside machinery spaces of category A approved of flame resistant types.*~~ *Fire endurance test shall be applied when mechanical joints are installed in pump rooms and open decks.*
2. *Slip on joints are not accepted inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces provided the joint are located in easily visible and accessible positions (refer to MSC/Circ.734).*
3. *Approved fire-resistant types except in cases where such mechanical joints are installed on open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines*
4. ~~*In pump rooms and open decks approved fire resistant types.*~~ *Fire endurance test shall be applied when mechanical joints are installed inside machinery spaces of category A.*

Footnotes Table 16.20 – General

5. ~~*Slip type slip-on joints as shown in Table 16.19. May be used for pipes on deck with a design pressure of 10 bar or less.*~~ *Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.*
6. ~~*Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.*~~ *Slip type slip-on joints as shown in Table 16.19. May be used for pipes on deck with a design pressure of 10 bar or less.*
7. *If a connection has passed the "30 min dry" test, it is considered suitable also for applications for which the "8 min dry+22 min wet" and/or "30 min wet " tests are required. If a connection has passed the "8 min dry+22 min wet" test, it is considered suitable also for applications for which the "30 min wet" test is required.*

~~\+ *Application is allowed* - *Application is not allowed*~~

Table 16.2 Application of mechanical joints depending upon the class of piping

Types of joints	Class I	Class II	Class III
Pipe Unions			
Welded and brazed type	+ (~~1~~ OD ≤ 60.3mm)	+ (~~1~~ OD ≤ 60.3mm)	+
Compression Couplings			
Swage-type	+	+	+
Press type	-	-	+
Typical compression type	+ (~~1~~ OD ≤ 60.3mm)	+ (~~1~~ OD ≤ 60.3mm)	+
Bite type	+ (~~1~~ OD ≤ 60.3mm)	+ (~~1~~ OD ≤ 60.3mm)	+
Flared type	+ (~~1~~ OD ≤ 60.3mm)	+ (~~1~~ OD ≤ 60.3mm)	+
Slip-on Joints			
Machine grooved type	+	+	+
Grip type	-	+	+
Slip type	-	+	+

(~~1~~ OD) *Outer pipe diameter ~~should be less than 60.3 mm.~~* + *Application is allowed* - *Application is not allowed*

Revision Date: April 2022

Entry into Force Date: 1 July 2022

Items D.10.1, D.10.2, D.10.3 and D.10.4.5 were revised according to UR P2.12 Rev.3 as below:,

Item D.10.4.5 was revised according to updating standard ISO 6802-2018 as below:

10. Hoses (see also Section 16, U)

10.1 A flexible hose assembly is a short length of metallic or non-metallic hose normally with prefabricated end fittings ready for installation.

Note:

Flexible hose assemblies for essential services or containing either flammable or toxic media are not to exceed 1.5 m in length.

10.1.1 Flexible hoses of metallic or non-metallic material is used for a permanent connection between a fixed piping system and items of machinery. Temporary connections of flexible hoses or hoses of portable equipment are to be approved by **TL**.

10.1.2 Flexible hose assemblies are to confirm **TL** requirements in this section for being used in fuel oil, lubricating, hydraulic and thermal oil systems, fresh water and sea water cooling systems, compressed air systems, bilge and ballast systems, and Class III steam systems.

Flexible hoses are not acceptable in high pressure fuel oil injection systems.

10.1.3 These requirements for flexible hose assemblies are not applicable to hoses intended to be used in fixed fire extinguishing systems.

10.2 Design and Construction

……

Flexible hose assemblies constructed of non-metallic materials intended for installation in piping systems for flammable media and sea water systems where failure may result in flooding are to be of a fire-resistant type except in cases where such hoses are installed on open decks, as defined in ~~SOLAS II-2/~~Regulation~~.~~ 9.2.3.3.2.2(10) of SOLAS Chapter II-2 as amended by IMO resolutions up to MSC.421(98) and not used for fuel oil lines. The installation of a shut-off valve immediately upstream of a sea water hose does not satisfy the requirements for fire-resistant type hose. Fire resistance is to be demonstrated by testing to ISO 15540:2016 and ISO 15541:2016.

……

10.3 Installation

……

The number of flexible hoses, in piping systems mentioned in 10.1.2 is to be kept to minimum and is to be limited for the purpose stated in 10.1.1.

……

10.4.5 The following standards are accepted by **TL** to be applied for type tests of the expansion joints:

- ISO 6802:2018 (Rubber and plastics hoses and hose assemblies ~~with wire reinforcement~~ – Hydraulic impulse test with flexing)
- ISO 6803:2017 (Rubber or plastics hoses and hose assemblies – Hydraulic-pressure impulse test without flexing)
- ISO 15540:2016 (Ships and marine technology – Fire resistance of hose assemblies – Test methods)
- ISO 15541:2016 (Ships and marine technology – Fire resistance of hose assemblies – Requirements for test bench)
- ISO 10380:2012 (Pipe work – Corrugated metal hoses and hose assemblies.)

Other standards may be accepted where agreed.

Note:

Prototype tests are to be carried out for each size of hose assembly. However, for ranges with more than 3 different diameters, the prototype tests are to be carried out for at least:

• the smallest diameter,
• the largest diameter,
• Intermediate diameters selected based on the principle that prototype tests carried out for a hose assembly with a diameter D are considered valid only for the diameters ranging between 0.5 D and 2 D.

For fire resistance tests the specimens shall be selected in accordance with ISO 15540:2016.

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Reference in Table 16.24 was revised according to UR P3 Rev.5 as below:

For more details about air pipe closing devices see TL-R P3 ~~"*Technical Circulars, Machinery, S-P 36/13 Air Pipe Closing Devices*".~~.

08. Section 18 – Fire Protection and Fire Extinguishing Equipment

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item A.3.12 was added, and Table 18.5 was revised according to UR F45 New as below:

3. Further Rules Applicable

3.1 Structural fire protection

Chapter 1 - Hull, Section 21

……

3.11 Rules for the firefighting ships,

Chapter 11 - Fire Fighting Ships

3.12 Rules for ballast water management systems, Installation of Ballast Water Management Systems, Item 4 and 5

……

Table 18.5 Minimum numbers and distribution of portable fire extinguishers in the various types of spaces

……

Other spaces	Workshops forming part of machinery spaces	1	B or C
	Other machinery spaces (auxiliary spaces, electrical equipment spaces, auto-telephone exchange rooms, air conditioning spaces, BWMR containing UV-type BWMS and other similar spaces)	1 **(7)**	B or C
	Weater deck	0 **(4)**	B
	Ro-ro spaces and vehicle spaces	No point of space is more than 20 m walking distance from an extinguisher at each deck level **(4) (5)**	B
	Cargo spaces	0 **(4)**	B
	Cargo pump-room and gas compressor room	2	B or C
	Helidecks	In accordance with Section 18, O.1	B

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Note under the item P.1.1.2 was revised according to UI SC85 Rev.2 as below:

Note :

A purpose built container space is a cargo space fitted with cell guides for stowage securing of containers.

Ro-ro spaces include special category spaces (SOLAS Reg. II-2/3.46~~20~~) and vehicle spaces(SOLAS Reg. II-2/ 3.49).

For the purposes of a ro-ro space fully open above and with full openings in both ends may be treated as a weather deck.

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Note under the item P.2 was revised according to UI SC49 Rev.3 as below:

Note:

~~*For ships of less than 500 GT the requirement may be dispensed with subject to acceptance by the Administration.*~~ *Subject to acceptance by the Administration, cargo ships of less than 500 gross tonnage are not required to be provided with fixed fire-extinguishing systems even when such ships are engaged in the carriage of dangerous goods and documents of compliance are issued to such ships.*

09. Section 20 – Tankers

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items B.2.2, B.4.3.3 and B 4.3.4 were revised according to UR F15 Rev.6 & UR F15 Rev.6 Corr.1 as below:

2.2 Design of cargo lines

.....

2.2.2 Welding is the preferred method of connecting cargo lines.

~~Cargo oil pipes shall not pass through ballast tanks. Exemptions for short lengths of pipes may be approved by TL on condition that item. 4.3.4 is applied analogously~~. Cargo oil pipes passing through segregated ballast tanks, as permitted by Regulation 19.3.6 of MARPOL Annex I, are to comply with item 4.3.4.

.....

4.3.3 On oil tankers there must be 2 pumps for ballasting segregated ballast tanks. If there is one pump, an additional inductor or an emergency discharge connection ~~through a spool piece to cargo pumps may be provided. A non-return device in the ballast system shall be provided to prevent the backflow of cargo into ballast tanks. The spool piece together with a warning notice shall be mounted in a conspicuous location in pump room.~~ to a cargo pump may be accepted. Segregated ballast systems shall not have any connections to the cargo system.

Nevertheless, provision may be made for emergency discharge of the segregated ballast by means of a connection to a cargo pump through a portable spool piece. In this case nonreturn valves should be fitted on the segregated ballast connections to prevent the passage of oil to the ballast tanks. The portable spool piece should be mounted in a conspicuous position in the pump room and a permanent notice restricting its use should be prominently displayed adjacent to it.

Shut-off valves shall be provided to shut off the cargo and ballast lines before the spool piece is removed.

The ballast pump is to be located in the cargo pump room, or a similar space within the cargo area not containing any source of ignition.

Ballast water is to be discharged in accordance with MARPOL 73/78 Annex I Reg.30.

.....

4.3.4 ~~Ballast water pipes, sounding and air pipes shall not pass through cargo oil tanks. Exemptions for short lengths of pipe may be approved by **TL** on condition that the following is complied with:~~

~~**a)** Minimum wall thicknesses~~

~~up to ND 50 mm. 6,3 mm.~~

~~up to ND 100 mm. 8,6 mm.~~

~~up to ND 125 mm. 9,5 mm.~~

~~up to ND 150 mm. 11,0 mm.~~

~~up to ND 200 mm. and larger 12,5 mm.~~

~~**b)** Only completely welded pipes or equivalent are permitted.~~

~~**c)** Where cargoes other than petroleum products are carried, relaxation from these Rules may be approved by **TL**.~~

Ballast piping passing through cargo tanks and cargo oil pipes passing through segregated ballast tanks, as permitted by Regulation 19.3.6 of MARPOL Annex I, are to comply with the following requirements.

4.3.4.1 The pipes are to be of heavy gauge steel of minimum wall thickness according to the table hereunder with welded or heavy flanged joints the number of which is to be kept to a minimum.

Expansion bends only (not glands) are permitted in these lines within cargo tanks for serving the ballast tanks and within the ballast tanks for serving the cargo tanks.

Nominal diameter (mm)	Minimum wall thickness (mm)
50	6.3
100	8.6
125	9.5
150	11.0
200 and above	12.5

4.3.4.2 The thicknesses shown in the above table refer to carbon steel.

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Note (4) under item C.4.3 was revised according to UI SC57 Rev.2 and TL-I SC70 was added to the item C.4.3 according to UI SC70 Rev.4 as below:

4.3 Vent openings for loading and discharging operations are to be located at a horizontal distance of at least 10 m. from the following *(See also TL-I SC70)*:

- Air intakes or openings to enclosed spaces which contain sources of ignition;

- Deck machinery ~~*(4)*~~ and equipment ***(4)*** liable to constitute a source of ignition.

(4) *Electrical equipment fitted in compliance with IEC ~~Publication~~ 60092- ~~Electrical installations in ships - Part~~ 502:1999 ~~Tankers - Special features~~ is not considered a source of ignition or ignition hazard. (MSC/Circ.1120 amended by MSC.1/Circ.1436 and MSC.1/Circ.1510)*

PART B – CHAPTER 5 ELECTRICAL INSTALLATION

01. Section 01 – General Requirements and Instructions

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item B.14 was revised in Section 1 of Chapter 5 according to UI SC10 Rev.3 as below:

14. Flame-Retardation of Individual Cables

Single cables and -wires are considered to be flame-retardant if they meet the test requirements of IEC publication 60332-1-2:2004+AMD1:2015 regarding flame propagation.

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item K.4 was revised according to UI SC194 Rev.1 as below:

.....

4. Electromagnetic Compatibility (EMC)

.....

4.2 All electrical and electronic appliances installed on the bridge and vicinity of the bridge other than mandatory navigation and communication equipment having been type tested according to IEC 60945:2002, as well as loose equipment placed on board by the builders or owners shall have been EMC tested for Conducted and Radiated Emission.

.....

4.2.1 The following are acceptable for the bridge and deck zone test standards:

- IEC 60945:2002 ~~Maritime navigation and radio communication equipment and systems – General requirements – Methods of testing and required test results~~
- IEC 60533:2015 ~~Electrical and electronic installations in ships – Electromagnetic Compatibility~~

.....

IEC standard 60533:2015 gives guidance to type of equipment and applicable tests.

.....

4.2.3 Evidence to be provided

All electrical and electronic appliances installed on the bridge and vicinity of the bridge other than mandatory navigation and communication equipment having been type tested according to IEC 60945:2002, as well as loose equipment placed on board by the builders or owners shall be listed and be provided with at least the following information. The list and the evidence of equipment are to be kept onboard.

02. Section 03 – Power Supply Installations

Revision Date: June 2022

Entry into Force Date: 1 July 2022

B, 1.2 was revised according to UI SC1 Rev.2 as below:

B. Main Electrical Power Supply

1. Design

……..

Minimum comforts for living on board include at least adequate services for lighting, cooking, heating, domestic refrigeration, mechanical ventilation, sanitary and drinking water. (SOLAS Reg. II-1/41.1.2 as amended)

……..

Revision Date: May 2022/June 2022

Entry into Force Date: 1 July 2022

Item B.4 was re-arranged according to UR E17 Rev.1 and UI SC1, Rev. 2 as below:

4. Generators Driven by the Main Propulsion Plant (e.g. Shaft-Driven Generators)

……..

Voltage and load sharing shall be in the limits acc. to 2.1, 2.2, 2.4.1, 2.4.2 and 2.5 (only to be observed in case of parallel operation) based on IEC 60092-301AMD2:1995.

……..

4.1.3 The short circuit current of the generator/generator system is sufficient to trip the generator/generator system circuit-breaker taking into account the selectivity of the protective devices for the distribution system.

Protection is to be arranged in order to safeguard the generator/generator system in case of a short circuit in the main bus bar. The generator/generator system is to be suitable for further use after fault clearance.

4.1.4 Standby sets are started in compliance with 5.2.4.

4.2 Generators which are driven by the main propulsion plant but which fail to conform to the conditions stated in 4.1 are not considered to constitute part of the main electrical power[1] supply, although they may be used as additional generators and on occasion maintain the entire power supply function provided the following conditions are met:

Note:

1. *Such generator systems are those whose operation does not meet the requirements of IEC 60092-201:2019, paragraph 8.1.1.*

4.2.2 There are sufficient and adequately rated additional generators fitted, which constitute the main source of electrical power required by SOLAS, meeting the requirements of IEC 60092-201:2019 paragraph 8.1.1**.**

4.2.3 Arrangements are fitted to automatically start one or more of the generators, constituting the main source of electrical power required by SOLAS, in compliance with item 5.2.4 and also upon the frequency variations exceeding ± 10% of the limits specified in 4.2.4.

4.2.4 Frequencies are to be kept within the limits stated in Section 1, F. For voltage and load sharing (only in case of parallel operation) furthermore the conditions stated in 2.1, 2.4.1, 2.4.2 and 2.5 based on IEC 60092-301AMD2:1995 are to be fulfilled.

4.2.5 The short circuit current of the generator and/or generator system is sufficient to trip the generator/generator system circuit-breaker taking into account the selectivity of the protective devices for the distribution system.

4.2.6 Where considered appropriate, load shedding arrangements are fitted to meet the requirements of 5.2.

4.2.7 On ships with remote control of the main engine from the bridge, it is necessary to ensure that, when manoeuvres preventing the continued operation of the shaftdriven generator plant are initiated, the supply to essential equipment is maintained from the shaft-driven generator plant until the load has been shifted to a stand-by generator to avoid a blackout situation.

Note: A 'blackout situation' means that the main and auxiliary machinery installations, including the main power supply, are out of operation but the services for bringing them into operation (e.g. compressed air, starting current from batteries etc.) are available.

~~**4.3** For the selectivity demands of the distribution system the short-circuit current shall be sufficient.~~

4.43 In case of frequency deviations exceeding 10 %, the generator is to be disconnected within 10-30 seconds.

03. Section 08 – High-Voltage Installations

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items B.3.2, B.4.1, D.2, D.2.1, D.2.1.1, D.2.1.7, D.3.2, D.4.3, D.5.1.1, D.5.1.2, D.6.1.1 in Section 8 of Chapter 5 were revised according to UR E11 Rev.4 as below:

3.2 Creepage distances

Creepage distances between live parts and between live parts and earthed metal parts are to be in accordance with IEC 60092-503:2007 for the nominal voltage of the system, the nature of the insulating material and the transient developed by switch and fault conditions.

.....

4. Degrees of Protection

4.1 Each part of the electrical installation is to be provided with a degree of protection appropriate to the location, as a minimum the requirements of IEC 60092-201:2019 and Table 8.3 are to be complied with, in addition to the provisions of Section 1, Table 1.10.

.....

2. Switchgear

Switchgear and controlgear assemblies are to be constructed according to the IEC 62271-200:2011 and the following additional requirements.

.....

2.1 Construction

Switchgear accessible for authorized persons only shall at least comply with accessibility type “A” of IEC 62271-200:2011; Annex AA; AA 2.2.

.....

2.1.1 Switchgear is to be of metal - enclosed type in accordance with IEC 62271-200:2011 or of the insulation - enclosed type in accordance with the IEC 62271-201:2014.

.....

2.1.7 Doors which give access to high voltage are to be interlocked in such a way that they can be opened only after closing the earthing switch.

At the entrance of the spaces where high-voltage electrical equipment is installed, a suitable marking is to be placed which indicates danger of high-voltage. As regard the high-voltage electrical equipment installed out-side a.m. spaces, the similar marking is to be provided. An adequate, unobstructed working space is to be left in the vicinity of high voltage equipment for preventing potential severe injuries to personnel performing maintenance activities. In addition, the clearance between the switchboard and the ceiling/deckhead above is to meet the requirements of the Internal Arc Classification according to IEC 62271-200:2011 (see 2.1).

.....

2.3.2 High-voltage test

A power-frequency voltage test is to be carried out on any switchgear and control gear assemblies. The test procedure and voltages are to be according to the IEC 62271-200:2011 section 7/ routine test.

.....

4.3 Tests

In addition to the tests normally required for rotating machinery, a high frequency high voltage test in accordance with IEC 60034-15:2009 is to be carried out on the individual coils in order to demonstrate a satisfactory withstand level of the inter-turn insulation to steep fronted switching surges.

.....

5. Power Transformers

5.1 Design

5.1.1 Power transformers and Liquid cooled transformers ~~shall conform to~~ have to comply with the applicable Parts of the IEC 60076 Series.

5.1.2 Dry-type transformers should be used by preference. They ~~shall conform to~~ have to comply with IEC 60076-11:2018. Exceptions shall be agreed with **TL.**

.....

6. Cables

6.1 General

6.1.1 High-voltage cables shall conform to IEC 60092-354:2020 or 60092-353:2016 or other equivalent standard.

04. Section 09 – Control, Monitoring and Ship's Safety Systems

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item D.7.1 was revised according to MSC.494(104) as below:

7.1 The Voyage Data Recorder should be supplied from the main- and emergency switchboard, see Section 4, I.9.1, 9.3 and also Resolution MSC.333(90) as amended by MSC.494(104).

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item D.8.8 was added according to UR F45 New as below:

8. Ballast water treatment plants

8.1 Ballast water treatment plants are to be approved by a flag administration acc. to Code for Approval of Ballast Water Management Systems (BWMS Code) (Res. MEPC 300(72))*.

.....

8.8 BWTS shall comply with TL Additional Rules- Installation of Ballast Water Management Systems.

05. Section 12 – Cable Network

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Note was added to item D.1.9 according to UI SC11 Rev.1 as below:

1.9 Cables for supply of essential equipment and emergency consumers, e.g. lighting and important communications- and signalling systems shall, wherever possible, bypass galleys, laundries, category A engine rooms and their casings and ~~areas with a~~ high fire risk areas considered as such in Regulation 9 of SOLAS Chapter II-2 as amended by IMO resolutions as to MSC.421(98).

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item D.14 was revised according to UI SC10 Rev.3 as below:

14. Measures for Limitation of the Propagation of Fire Along Cable-and Wire Bundles

~~**14.1**~~ All cables shall be so installed that the original flame-retardant properties of the individual cables are not impaired. This requirement ~~can be considered to be fulfilled if~~ may be achieved by:

~~**14.1.1** The bundled cables are individually flame-retardant and have been successfully passed the bundle fire test in accordance with IEC publication 60332-3-21;~~ Method 1;

Cables which have been tested in accordance with IEC 60332-3-22:2018 Category A or a test procedure for cables installed in bunches equivalent thereto.

~~**14.1.2** Suitable measures have been taken during the installation, e.g. by providing of fire stops or application of flameproof coatings.~~

~~**14.2** For cable bundles consisting of cables which have not been subjected to a bundle fire test, the following precautions shall be taken to limit the fire propagation:~~ Method 2 (See Figures 12.1-12.4);

14.2.1 ~~Fire stops shall be provided:~~ Fire stops having at least B-0 penetrations fitted as follows:

14.2.1.1 ~~At main- and emergency switchboards,~~ cable entries at the main and emergency switchboard,

14.2.1.2 ~~At cable entries to engine control rooms,~~ where cables enter engine control rooms,

14.2.1.3 ~~At central control panels and -consoles for the main propulsion plant and for important auxiliaries,~~ cable entries at centralized control panels for propulsion machinery and essential auxiliaries,

14.2.1.4 ~~At each end of totally enclosed cable trunks.~~ at each end of totally enclosed cable trunks; and

14.2.2 ~~In closed- and semi-enclosed rooms, fire stops shall be provided at the following locations:~~ In enclosed and semi-enclosed spaces, cable runs are to comply with the following:

14.2.2.1 To have fire protection coating applied:

- To at least 1 meter in every 14 meters
- To entire length of vertical runs, or

-

14.2.2.2 Fitted with fire stops having at least B-0 penetrations every second deck or approximately 6 meters for vertical runs and at every 14 meters for horizontal runs.

The cable penetrations are to be installed in steel plates of at least 3 mm thickness extending all around to twice the largest dimension of the cable run for vertical runs and once for horizontal runs, but need not extend through ceilings, decks, bulkheads or solid sides of trunk. In cargo area, fire stops need only be fitted at the boundaries of the spaces.

06. Section 15 – Additional Rules for Tankers

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item A.3.2 was revised, second sentence of A.3.2 was renumbered as A.3.3 and item 5 was revised according to UI SC70 Rev.4 as below:

3.2 Areas on open deck, or semi-enclosed spaces on open deck, within 3 m of cargo tank ventilation outlets which permit the flow of small volumes of vapour or gas mixtures caused by thermal variation are defined as Zone 1 as specified by IEC 60092-502:1999 para 4.2.2.7.

3.3 Areas within 2 m beyond the zone specified in item 3.2 above are to be considered as Zone 2 (as opposed to 1.5m as specified by IEC 60092-502:1999 para 4.2.3.1).

……..

5. **Cable Installation**

5.1 In tankers, electrical equipment, cables and wiring shall not be installed in hazardous locations unless it conforms with standards not inferior to those acceptable to the **TL** (Refer to the standards published by the International Electrotechnical Commission, IEC 60092-502:1999 ~~Electrical Installations in Ships – Tankers~~).

……..

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Note under Item A.5.1 was revised according to UI SC274 Rev.1 as below:

Note:

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

07. Section 16 – Additional Rules for Ships For the Carriage of Motor Vehicles

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item H.1.1 was revised according to UI SC43 Rev.3 as below:

H. Permissible Electrical Equipment

1. Inside of the Protection Area (Zone 1)

1.1 Electrical equipment shall be of a certified safe type with Explosion Group IIA and Temperature Class T3 as defined in IEC 60079-10-1:2015. Refer to IEC 60079-14:2013 for types of protection suitable for use in Zone 1 areas.

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item H.2.1 was revised according to UI SC42 Rev.3 as below:

2. Above the Protection Area (Zone 2)

2.1 Equipment in accordance with Section 1, K. 3.4.2 is permitted; the surface temperature shall not exceed 200 °C. Electrical equipment shall have an enclosure of at least IP55, or apparatus suitable for use in Zone 2 areas as defined in IEC 60079-10-1:2015. Refer to IEC 60079-14:2013 for types of protection suitable for use in Zone 2 areas.

08. Section 17 – Additional Rules for Ships for the Carriage of Dangerous Goods

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item B, 6 and D, 1.3 were revised according to UI SC79 Rev.5 as below:

B. References to Other Rules

.....

6. IEC publication 60092-506:2003 ~~Special features - Ships carrying specific dangerous goods and materials hazardous only in bulk~~.

.....

D. Hazardous Areas and Permitted Electrical Equipment

.....

1.3 For pipes having open ends (e.g., ventilation and bilge pipes, etc.) in a hazardous area, the pipe itself is to be classified as hazardous area. See IEC 60092-506:2003 table B1, item B.

.....

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

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Section 18 was generally revised in accordance with UI SC180, Rev.4 and Item B.3.2.1 was revised according to UI SC179 Rev.3 as below:

3.2 Requirements depending on location

3.2.1 Protection of the enclosures of electrical components installed in the cargo holds, ballast tanks and dry spaces is to satisfy the requirements of IP 68 in accordance with IEC 60529.

Protection of the enclosures of electrical equipment for the dewatering system installed in any of the forward dry spaces are to satisfy IPX8 standard as defined in IEC ~~Publication~~ 60529:1989/AMD2:2013/COR1:2019 for a water head equal to the height of the space in which the electrical equipment is installed for a time duration of at least 24 hours.

10. Section 20 – Electrical Equipment

Revision Date: June 2022

Entry into Force Date: 1 July 2022

Item A.4.3.6 in Section 20 of Chapter 5 was revised according to UR E13 Rev.3 Corr.1 as below:

4.3.6 Temperature rise test

……..

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

……..

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item A.4.3.11 in Section 20 of Chapter 5 was revised according to UR E11 Rev.4 as below:

4.3.11 Dielectric strength test (high-voltage test)

……..

- Electrical machines with voltage ratings acc. to Section 8 shall be subjected to a lightning impulse withstand voltage test acc. to IEC 60034-15:2009. The test shall be carried out for the coils as a random sample test.

……..

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items D.4.1.1, D.4.1.2.1, D.4.2.1 and D.4.3.2 in Section 20 of Chapter 5 were revised according to UR E21 Rev.1as below:

4.1.1 These requirements to UPS units, as defined in IEC 62040-3:2011, apply when providing an alternative power supply or transitional power supply to services as defined in Section 3, C.

.....

4.1.2.1 Uninterruptible power system (UPS)

Combination of converter, inverter, switches and energy storage means, for example batteries, constituting a power supply system for maintaining continuity of load power in case of input power failure (IEC ~~publication~~ 62040-3:2011).

4.2 Design and construction

4.2.1 UPS units are to be constructed in accordance with ~~IEC 62040~~ IEC 62040-1:2017, IEC 62040-2:2016, IEC 62040-3:2011, IEC 62040-4:2013 and/or IEC 62040-5 3:2016, as applicable, or an acceptable and relevant national or international standard. Battery ventilation shall be designed in accordance with Section 2,C.

.....

4.3.2 UPS units utilising valve regulated sealed batteries may be located in compartments with normal electrical equipment, provided the ventilation arrangements are in accordance with the requirements of ~~IEC 62040~~ IEC 62040-1:2017, IEC 62040-2:2016, IEC 62040-3:2011, IEC 62040-4:2013 and/or IEC 62040-5-3:2016, as applicable, or an acceptable and relevant national or international standard.

.....

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item F.1.4 in Section 20 of Chapter 5 was revised according to UR E7 Rev.5 as below:

1.4 Cables manufactured in accordance with the relevant recommendations of IEC 60092-350:2020, 60092-352:2005, 60092-353:2016, 60092-354:2020, 60092-360:2014 ~~(*)~~, 60092-370:2019, 60092-376:2017 will be accepted by **TL** provided that they are tested to its satisfaction.

~~*(*): Rationalization of the number of insulating and sheathing materials. In particular polyvinylchloride based insulation (PVC) and sheath (ST 1) have been removed.*~~

PART C – CHAPTER 10 – LIQUEFIED GAS TANKERS

01. Section 11 – Fire Protection and Extinction

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Note was added under item 11.1.4 according to UI GC38 New as below:

11.1.4 For the purposes of firefighting, any weather deck areas above cofferdams, ballast or void spaces at the after end of the aftermost hold space or at the forward end of the forwardmost hold space shall be included in the cargo area.

Note:

Where 'F.O. tanks' are installed at the after end of the aftermost hold space or at the forward end of the forwardmost hold space instead of cofferdams as allowed for in Section 3, Items 3.1.2 and 3.1.3, the weather deck area above these tanks shall be regarded as a 'cargo area' for the purpose of applying Item 11.3.6.

PART C – CHAPTER 28 - VENTILATION

01. Section 01 – Ventilation

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item E.18 was added according to UR F45 New as below:

18. Ballast Water Management Room (BWMR)

The requirements in **TL** Additional Rule "Installation of Ballast Water Management Systems" apply.

PART C – CHAPTER 35 – TENTATIVE RULES FOR SHIPS LESS THAN 500 GT

01. B – Machinery - Section 04 – Hull Piping Systems (Pipe Lines, Valves, Fittings and Pumps)

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item D.2.3 and 2.10.2 were revised according to UR P3 Rev.5 as below:

2.3 Air pipe closing devices

Air/overflow pipes terminating above the open deck are to be fitted with approved air pipe heads.

To prevent blocking of the air pipe head openings by their floats during tank discharge the maximum allowable air velocity determined by the manufacturer is to be observed.

For more details about air pipe closing devices see TL-R P3.

.....

~~For more details about air pipe closing devices see "Technical Circulars, Machinery, S-P-36/13 Air Pipe Closing Devices".~~

02. D – Fire Safety – Section 4 – Structural Fire Protection

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Items B.2.2.2.2 (5), (6), (7) and (9) were revised according to UR F45 New as below:

(5) Service spaces (low risk)

Lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m^2 and drying rooms and laundries

Spaces where the storage of liquid or solid chemicals for BWMS if the surface area is less than 4 m^2 and if no flammable products are stored

(6) Machinery spaces of category A

BWMR containing oil-fired inert gas generators

(7) Other machinery spaces

Electrical equipment rooms (auto-telephone exchange, air-conditioning duct spaces)

Machinery spaces excluding machinery spaces of category A

BWMR

(8) Cargo spaces

All spaces used for cargo (including cargo oil tanks), and trunkways and hatchways to such spaces

(9) Service spaces (high risk)

Galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms having areas of 4 m^2 or more, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces

Spaces where the storage of liquid or solid chemicals for BWMS if the surface area of 4 m^2 or more

03. D – Fire Safety – Section 6 – Escape

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item D.7 was added according to UR F45 New as below:

7. An emergency escape breathing apparatus (EEBD) is to be provided in the BWMR. This emergency escape breathing apparatus may be one of the EEBDs provided in accordance with the requirements of SOLAS II-2/13.

An EEBD need not be required for BWMS of cat.1 as per Table 1 in **TL** Additional Rule "Installation of Ballast Water Management Systems".

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

01. Section 07 – Craft Operation Installations and Auxiliary Systems

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item D.2 was revised according to UR P3 Rev.5 as below:

Air pipe closing devices shall be constructed to ~~Technical Circulars, Machinery, S-P 36/13 Air Pipe Closing Devices~~ **TL-R P3.**

ADDITIONAL RULE – INSTALLATION OF BALLAST WATER MANAGEMENT SYSTEMS

01. General

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Additional Rule was revised generally according to UR M74 Rev.2 and UR F45 New.

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

01. General

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Standard references on the Additional Rule were revised generally according to UR E10 Rev.8.

GUIDELINES – GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS

01. Section B – SCR – Selective Catalytic Reduction Systems

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item B.6.2.1 was revised according to UR M77 Rev.3 as below:

6.2.1 Reductant Tank, Piping and Connections

.....

v) Reductant tanks are to be of steel or other equivalent material* with a melting point above 925 degrees C.

Pipes/piping systems are to be of steel or other equivalent material with melting point above 925 degrees C, except downstream of the tank valve, provided this valve is metal seated and arranged as fail-to-closed or with quick closing from a safe position outside the space in the event of fire; in such case, type approved plastic piping may be accepted even if it has not passed a fire endurance test. Reductant tanks and pipes/piping systems are to be made with a material compatible with reductant or coated with appropriate anti-corrosion coating.

Non-alloyed steels, copper, copper containing alloys, and zinc-coated steels are not to be used for reductant storage or piping systems

** Footnote to (v): Material requirement "to be of steel or other equivalent material" in the first paragraph with a melting point above 925 degrees C is not applicable for integral tanks on FRP vessels such as those listed below, provided that the integral tanks are coated and/or insulated with a self-extinguishing material.*

1) FRP vessels complying with Regulation 17 of SOLAS Chapter II-2 based upon its associated IMO guidelines (MSC.1/Circ.1574), and

2) FRP vessels exempted from the application of SOLAS e.g., yachts, fast patrol, navy vessels, etc., generally of less than 500 gross tonnage, subject to yacht codes or flag regulations.

02. Section C – EGCS-SOx

Revision Date: May 2022

Entry into Force Date: 1 July 2022

Item C.10 was added according to UR M81 New and item C.6.3 was deleted. Item C.6.3 was harmonised with new item C.10 as below:

6.3 Chemical Treatment Piping Systems

For details see 10.1.4 and 10.2 ÷ 10.5.

~~The requirements for the washwater chemical treatment system detailed in this Subsection are based on the use of Caustic Soda (Sodium Hydroxide, NaOH) solution. If other chemicals are used, the requirements are to be consistent with the intent of the requirements for NaOH, but are assessed on a case-by-case basis.~~

~~The requirements detailed below are also based on an arrangement whereby the EGC residue tank is also used as an overflow tank for the NaOH storage tank. Arrangements that separate these functions into separate tanks may~~

be applied, and in which case, the requirements for the overflow tank are detailed in C.6.5 of this Guideline and the requirements for the residue tank in C.6.7 of this Guideline.

6.3.1 Material for Piping Systems, NaOH Storage Tank and EGC Residue/NaOH Overflow Tank

The material of the NaOH related piping systems, NaOH storage tank, EGC residue/NaOH overflow tank, drip trays, and any other components which may come into contact with the NaOH solution or sludge is to be of a suitable grade of stainless steel or other corrosion-resistant material established to be suitable for the application. Aluminum, zinc, brass, or galvanized steel components are not to be used.

6.3.2 Bunkering of NaOH

i) The bunker station(s) for NaOH is/are to be located on the open deck away from sources of ignition and arranged such that a spill at a bunker station would not result in NaOH contacting or mixing with other incompatible materials.
Alternatively, closed or semi-enclosed bunker stations may be approved subject to the provision of effective ventilation.

ii) Spill trays, which may be of the dry type or have means of drainage to the EGC residue/ NaOH overflow tank, are to be provided.

6.3.3 Arrangement of the NaOH Storage Tank and EGC Residue/NaOH Overflow Tank

i) The NaOH storage and EGC residue/NaOH overflow tank are not to be situated where spillage or leakage therefrom can constitute a hazard by falling onto combustibles or heated surfaces. In particular, these tanks are not to be located over boilers or in close proximity to steam piping (supply or returns).

ii) Where necessary, the NaOH storage tank is to be provided with an appropriate heating system to prevent freezing.

6.3.4 Filling, Vents, and Overflows for NaOH Tank and EGC Residue/NaOH Overflow Tank

i) *Filling.*The NaOH storage tank is to be provided with a fill line from the bunker station, and a shutoff valve is to be provided at the bunkering station.

Overflow and/or drains leading to the EGC residue/NaOH overflow tank are to enter at or near the top of the tank. However, if this is determined to be impracticable, these lines are to be fitted with a non-return valve at the EGC residue/NaOH overflow tank.

ii) *Vents.*The NaOH storage and EGC residue/NaOH overflow tanks are to be provided with vent pipes complying with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R, and the outlets are to terminate in a safe location in the weather.

Vents are not to be subject to deterioration due to the concentrations involved, and the arrangement is to be such that the potential source of moisture from the vents does not present any danger to the crew or vessel. Alternatively, the tanks are to be fitted with appropriately sized pressure/vacuum valves.

iii) *Overflow Protection.* Means are to be provided to prevent NaOH from spilling or accidently overflowing from the storage and EGC residue/NaOH overflow tanks. Accordingly, the NaOH storage tank is to be fitted with a high level alarm. Alternatively, the NaOH storage tank may be fitted with an overflow arrangement complying with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, G. and R. that is led to the EGC residue/ NaOH overflow tank. Further, in all cases, the EGC residue/NaOH overflow tank is to be fitted with a high level alarm. Other anti-spilling arrangements may be considered on a case-by-case basis.

6.3.5 Sounding and Temperature Indication for the NaOH Storage and EGC Residue/NaOH Overflow Tanks

i) Sounding arrangements are to be provided for the NaOH storage and EGC residue/NaO overflow tanks, and are to comply with the sounding requirements applicable to fuel oil tanks of **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R.2.

ii) A sight glass is not to be used unless the materials of construction are compatible with the concentration of NaOH solution involved, it is well protected from mechanical damage, and the arrangements are equivalent to that required in **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R.2. (i.e., flat "glass type", fitted with a self-closing valve at each end).

iii) In addition to local level gauging, the NaOH storage and EGC residue/NaOH overflow tanks are to have remote level gauging indication at the manned control station.

iv) The NaOH storage and EGC residue/NaOH overflow tanks are to be provided with local and remote temperature monitoring arrangements. The remote temperature indication is to be installed at the manned control station.

6.3.6 Spill Trays

i) Those areas of the NaOH storage and EGC residue/NaOH overflow tanks that could result in leakage, locations where leakage from pumps and other associated equipment such as strainers, heaters, flanges, valves, etc., which may require occasional dismantling for examination or maintenance may occur, and where leakage may otherwise normally be expected are to be located within spill trays.

ii) Either drainage arrangements for the spill tray that lead to the dedicated EGC residue/ NaOH overflow tank are to be provided or arrangements to activate an alarm in the event of spillage are to be provided. Where drainage arrangements are provided, the drain line to the EGC residue/NaOH overflow tank is to be fitted with a non-return valve.

6.3.7 Miscellaneous Piping Arrangements

i) The NaOH piping systems are to be independent of other ship service piping and/or systems.

ii) Piping systems for NaOH systems are not to be located in accommodation, service, or control spaces.

iii) Every pipe emanating from a tank containing NaOH, which, if damaged, would allow NaOH to escape from the tank, is to be provided with a positive closing valve located directly on the tank. The positive closing valve is to be provided with means of closure both locally and from a readily accessible and safe position outside of the space.

~~**iv)** Pipe joints are to be kept to a minimum. The direct connections of pipe lengths are to be all welded except for necessary flanged connections to valves and other equipment for maintenance in order to minimize risk of leakage from the pipe lines.~~

~~**v)** Supply, bunkering and transfer lines for NaOH 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.~~

~~**6.3.8 Ventilation Arrangements**~~

~~The NaOH storage and EGC residue/NaOH overflow tanks may be located within the engine room or in a separate compartment. In either location, the area is to be served by an effective mechanical exhaust ventilation system with ventilation inlets located where any vapors would be expected to accumulate. In addition, if located in a separate compartment, the ventilation system is to be capable of being controlled from outside the compartment.~~

~~**6.3.9 Personnel Protection**~~

~~For the protection of crew members, the vessel is to have on board suitable protective equipment consisting of large aprons, rubber gloves with long sleeves, rubber boots, coveralls of chemicalresistant material, and tight-fitting chemical safety goggles or face shields or both. The protective clothing and equipment is to cover all skin so that no part of the body is left unprotected. The quantities of personel protective equipment carried onboard is to be appropriate for the number of personnel engaged in regular handling operations or that may be exposed in the event of a failure; but in no case is there to be less than two sets available onboard.~~

~~Eyewash and safety showers are to be provided, the location and number of these eyewash stations and safety showers are to be derived from the detailed installation arrangements. As a minimum, the following stations are to be provided:~~

~~**i)** In the vicinity of transfer or treatment pump locations. If there are multiple transfer or treatment pump locations on the same deck then one eyewash and safety shower station may be considered for acceptance provided that the station is easily accessible from all such pump locations on the same deck.~~

~~**ii)** An eyewash station and safety shower is to be provided in the vicinity of a chemical bunkering station on-deck. If the bunkering connections are located on both port and starboard sides, then consideration is to be given to providing two eyewash stations and safety showers, one for each side.~~

~~**iii)** An eyewash station and safety shower is to be provided in the vicinity of any part of the system where the potential for a person to come into contact with the chemicals exists (e.g., openings such as filling/drainage or system connections/components that require periodic maintenance).~~

~~Depending on the specific arrangements (e.g., vessel type, size, layout of deck, machinery space, etc.), consideration may be given so that the personnel protection arrangements required by this section may be shared with those required by B.6.3.5 of this Guideline.~~

~~**6.3.10 Safety Notices for the Compartment or at the Location of Tanks Containing NaOH**~~

~~Safety instructions relating to precautions and corrective response actions are to be posted in the compartment containing NaOH, and beside the entrance to the compartment. Detailed guidelines given in the MSDS are to be followed.~~

~~**6.4 Residue System**~~

~~**i)** The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities, in accordance with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, O.2.~~

~~The EGC residue tank is to be designed to facilitate cleaning.~~

~~Where EGC residue tanks used in closed loop chemical treatment systems are also used as the overflow tank for the NaOH storage tank, the additional requirements of C.6.5 of this Guideline are to be applied.~~

~~**ii)** The material of the EGC residue tank is to be selected based on the corrosive nature of the EGC residue.~~

~~**iii)** The capacity of the EGC residue tank is to be based on the expected residue volumes applicable to the number and type of installed scrubbers and the maximum period of voyage between ports where EGC residue can be discharged. In the absence of precise data, a figure of 30 days is to be used.~~

~~**iv)** The EGC residue tank is to be provided with vent pipes complying with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R.~~

~~**v)** The residue tank is to be arranged with a high level alarm.~~

~~**vi)** Sounding arrangements are to be provided for the EGC residue tank in accordance with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R.2.2.~~

~~**vii)** For those vessels that do not undertake onboard incineration and collect all engine room sludge for disposal ashore, consideration will be given to arrangements utilizing a combined engine room sludge and EGC residue tank, provided the tank meets the requirements of C.6.7 i) through vi) of this Guideline, EGCS residue record book satisfy the requirements of MEPC.340(77), and residues are disposed at MARPOL reception facilities.~~

~~Combined engine room sludge and EGC residue tanks are to be sized to provide adequate capacity based on the sludge tank capacity requirements of **TL** Rules, Part B, Chapter 4, Machinery, Section 16, V.5.2 plus the capacity requirements for EGC residue tanks of C.6.4.iii of this Guideline.~~

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10. Safety measures against chemical treatment fluids used for exhaust gas cleaning systems and the residues which have hazardous properties

10.1 General

10.1.1 With regard to regulation 14 of MARPOL Annex VI requiring ships to use fuel oil with a sulphur content not exceeding that stipulated in regulations 14.1 or 14.4, regulation 4 allows, with the approval of the Administration, the use of an alternative compliance method at least as effective in terms of emission reductions as that required by the MARPOL Annex VI, including the standards set forth in regulation 14.

10.1.2 As some types of exhaust gas cleaning systems to be approved by the Administration as “alternative compliance method” consume chemicals which are typically carried on board in bulk quantities, the prescriptive requirements contained in this item related safety measures against chemical treatment fluids apply to exhaust gas cleaning systems using such fluids. In this context, the term “chemical treatment fluid” means the aqueous solution of sodium hydroxide (NaOH) or calcium hydroxide ($Ca(OH)_2$) that has corrosive properties or are considered to represent a hazard to personnel (See item 10.2).

10.1.3 For exhaust gas cleaning systems using chemicals other than the above, safety measures are to be taken according to the result of a risk assessment to be conducted to analyze the risks, in order to eliminate or mitigate the hazards to personnel brought by the use of such exhaust gas cleaning systems, to an extent equivalent to systems complying with 10.2.1 to 10.2.16.

10.1.4 The requirements detailed below are based on an arrangement whereby the EGC residue tank is also used as an overflow tank for the chemical treatment fluid storage tank. Arrangements that separate these functions into separate tanks may be applied, and in which case, the requirements for the overflow tank are detailed in 10.2 and the requirements for the residue tank in 10.4.

10.2 Requirements for exhaust gas cleaning systems using aqueous solution of NaOH or $Ca(OH)_2$ for chemical treatment fluid

10.2.1 The storage tank for chemical treatment fluids and EGC residue/overflow tank is to be arranged so that any leakage will be contained and prevented from making contact with heated surfaces. In particular, these tanks are not to be located over boilers or in close proximity to steam piping (supply or returns). All pipes or other tank penetrations are to be provided with manual closing valves attached to the tank. In cases where such valves are provided below top of tank, they are to be arranged with quick acting shutoff valves which are to be capable of being remotely operated from a position accessible even in the event of chemical treatment fluid leakages.Tank and piping arrangements are to be approved.

10.2.2 The storage tank is to be protected from excessively high or low temperatures applicable to the particular concentration chemical treatment fluids. Depending on the operational area of the ship, this may necessitate the fitting of heating and/or cooling systems.

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 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, 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.

10.2.5 Filling, Vents, and Overflows for Storage Tank and EGC Residue/NaOH Overflow Tank

Following requirements are given for NaOH. If other chemicals including $Ca(OH)_2$ are used, the requirements are to be consistent with the intent of the requirements for NaOH, but are assessed on a case-by-case basis.

10.2.5.1 The storage tank is to be provided with a fill line from the bunker station, and a shutoff valve is to be provided at the bunkering station.

Overflow and/or drains leading to the EGC residue/overflow tanks are to enter at or near the top of the tank. However, if this is determined to be impracticable, these lines are to be fitted with a non-return valve at the EGC residue/overflow tank.

10.2.5.2 The storage and EGC residue/overflow tanks are to be provided with vent pipes complying with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R, and the outlets are to terminate in a safe location in the weather.

Vents are not to be subject to deterioration due to the concentrations involved, and the arrangement is to be such that the potential source of moisture from the vents does not present any danger to the crew or vessel. Alternatively, the tanks are to be fitted with appropriately sized pressure/vacuum valves.

10.2.5.3 Means are to be provided to prevent chemical treatment fluids from spilling or accidently overflowing from the storage and EGC residue/overflow tanks. Accordingly, the storage tank may be fitted with a high level alarm. Alternatively, the storage tank may be fitted with an overflow arrangement complying with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, G. and R. that is led to the EGC residue/overflow tank. Further, in all cases, the EGC residue/overflow tank is to be fitted with a high level alarm. Other anti-spilling arrangements may be considered on a case by case basis.

10.2.6 Sounding and Temperature Indication for the Storage and EGC Residue/Overflow Tanks

10.2.6.1 Sounding arrangements are to be provided for the storage and EGC residue/overflow tanks, and are to comply with the sounding requirements applicable to fuel oil tanks of **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R.2.

10.2.6.2 A sight glass is not to be used unless the materials of construction are compatible with the concentration of chemical treatment fluids involved, it is well protected from mechanical damage, and the arrangements are equivalent to that required in **TL** Rules, Part B, Chapter 4, Machinery, Section 16, R.2 (i.e., flat “glass-type”, fitted with a self-closing valve at each end).

10.2.6.3 Each storage tank for chemical treatment fluids and EGC residue/overflow tanks are to be provided with level monitoring arrangements and high/low level alarms. In cases where heating and/or cooling systems are provided, high and/or low temperature alarms or temperature monitoring are also to be provided accordingly.

10.2.7 The storage tanks are to have sufficient strength to withstand a pressure corresponding to the maximum height of a fluid column in the overflow pipe, with a minimum of 2.4 m above the top plate taking into consideration the specific density of the treatment fluid.

10.2.8 Where chemical treatment fluid is stored in integral tanks, the following are to be considered during the design and construction:

10.2.8.1 These tanks may be designed and constructed as integral part of the hull, (e.g. double bottom, wing tanks).

10.2.8.2 These tanks are to be coated with appropriate anti-corrosion coating and are to be segregated by cofferdams, void spaces, pump rooms, empty tanks or other similar spaces so as to not be located adjacent to accommodation, cargo spaces containing cargoes which react with chemical treatment fluids in a hazardous manner as well as any food stores, oil tanks and fresh water tanks.

10.2.8.3 These tanks are to be designed and constructed as per the structural requirements applicable to hull and primary support members for a deep tank construction.

10.2.8.4 These tanks are to be included in the ship's stability calculation.

10.2.9 The requirements specified in 10.2.3 also apply to closed compartments normally entered by persons:

10.2.9.1 when they are adjacent to the integral storage tank for chemical treatment fluids and there are possible leak points (e.g. manhole, fittings) from these tanks; or

10.2.9.2 when the treatment fluid piping systems pass through these compartments, unless the piping system is made of steel or other equivalent material with melting point above 925 degrees C and with fully welded joints.

10.2.10 The chemical treatment fluid piping and venting systems are to be independent of other ship service piping and/or systems. The chemical treatment fluid piping systems are not to be located in accommodation, service spaces, or control stations. The vent pipes of the storage tank are to terminate in a safe location on the weather deck and the tank venting system is to be arranged to prevent entrance of water into the tank for chemical treatment fluids.

10.2.11 Storage tanks, EGC residue/overflow tanks and pipes/piping systems 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.

10.2.12 Storage tanks, EGC residue/overflow tanks and pipes/piping systems for chemical treatment fluids or sludge are to be made with a material compatible with chemical treatment fluids, or coated with appropriate anticorrosion coating.

Footnote:
Several metals are incompatible with the chemical treatment fluids, e.g. NaOH is incompatible with zinc, aluminum, etc.

10.2.13 Regardless of design pressure and temperature, piping systems containing chemical treatment fluids only are to comply with the requirements applicable to Class I piping systems. As far as practicable, e.g. except for the flange connections that connect to tank valves, the piping systems are to be joined by welding.

10.2.14 The following connections are to be screened and fitted with drip trays to prevent the spread of any spillage where they are installed:

10.2.14.1 Detachable connections between pipes (flanged connections and mechanical joints, etc.);

10.2.14.2 Detachable connections between pipes and equipment such as pumps, strainers, heaters, valves, etc, which may require occasional dismantling for examination or maintenance may occur; and

10.2.14.3 Detachable connections between equipment mentioned in the above subparagraph.

The drip trays are to be fitted with drain pipes which lead to appropriate tanks, such as residue/overflow tanks, which are fitted with high level alarm, or are to be fitted with alarms for leak detection. In cases where such tank is an integral tank, 10.2.8.1 and 10.2.8.2 are to be applied to the tank.

10.2.15 Personnel Protection

10.2.15.1 For the protection of crew members, the ship is to have on board suitable personnel protective equipment. The number of personnel protective equipment carried onboard is to be appropriate for the number of personnel engaged in regular handling operations or that may be exposed in the event of a failure; but in no case is there to be less than two sets available onboard.

10.2.15.2 Personnel protective equipment is to consist of large aprons, protective clothing, rubber boots, coveralls of chemical resistant material, rubber gloves with long sleeves and tight-fitting chemical safety goggles or face shield or both. The protective clothing and equipment is to cover all skin so that no part of the body is left unprotected.

Eyewash and safety showers are to be provided, the location and number of these eyewash stations and safety showers are to be derived from the detailed installation arrangements. As a minimum, the following stations are to be provided:

10.2.15.3 In the vicinity of transfer or treatment pump locations. If there are multiple transfer or treatment pump locations on the same deck then one eyewash and safety shower station may be considered for acceptance provided that the station is easily accessible from all such pump locations on the same deck.

10.2.15.4 An eyewash station and safety shower is to be provided in the vicinity of a chemical bunkering station on-deck. If the bunkering connections are located on both port and starboard sides, then consideration is to be given to providing two eyewash stations and safety showers, one for each side.

10.2.15.5 An eyewash station and safety shower is to be provided in the vicinity of any part of the system where a spillage/drainage may occur and in the vicinity of system connections/components that require periodic maintenance.

10.2.15.6 Depending on the specific arrangements (e.g. vessel type, size, layout of deck, machinery space, etc.), consideration may be given so that the personnel protection arrangement required by this subsection may be shared with those required by B.6.2.5.

10.2.15.7 Safety Notices for the Compartment or at the Location of Tanks Containing Chemical Treatment Fluid

Safety instructions relating to precautions and corrective response actions are to be posted in the compartment containing chemical treatment fluid, and beside the entrance to the compartment. Detailed guidelines given in the MSDS are to be followed.

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

10.3 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.

10.4 Residue System

The residues generated from the exhaust gas cleaning process are to be stored in a designated residue tank, separate from the engine room sludge tank, and arranged for discharge to appropriate shore reception facilities, in accordance with **TL** Rules, Part B, Chapter 4, Machinery, Section 16, O.2 and satisfy the following requirements:

10.4.2 The tanks are to be independent from other tanks, except in cases where these tanks are also used as the over flow tanks for chemical treatment fluids storage tank.

10.4.3 The EGC residue tank is to be designed to facilitate cleaning.

10.4.4 Where residue tanks used in closed loop chemical treatment systems are also used as the overflow tanks for chemical treatment fluids storage tank, the requirements for storage tanks apply.

10.4.5 The material of the EGC residue tank is to be selected based on the corrosive nature of the EGC residue.

10.4.6 Tank capacities are to be decided in consideration of the number and kinds of installed exhaust gas cleaning systems as well as the maximum number of days between ports where residue can be discharged ashore. In the absence of precise data, a figure of 30 days is to be used.

10.4.7 For those vessels that do not undertake onboard incineration and collect all engine room sludge for disposal ashore, consideration will be given to arrangements utilizing a combined engine room sludge and EGC residue tank, provided the tank meets the requirements of 10.4.1 through 10.4.6, EGCS residue record book satisfy the requirements of MEPC.340(77), and residues are disposed at MARPOL reception facilities.

Combined engine room sludge and EGC residue tanks are to be sized to provide adequate capacity based on the sludge tank capacity requirements of **TL** Rules, Part B, Chapter 4, Machinery, Section 16, V.5.2 plus the capacity requirements for EGC residue tanks of 10.4.6.

10.5 Bunkering of NaOH

10.5.1 The bunker station(s) for NaOH is/are to be located on the open deck away from sources of ignition and arranged such that a spill at a bunker station would not result in NaOH contacting or mixing with other incompatible materials.

Alternatively, closed or semi-enclosed bunker stations may be approved subject to the provision of effective ventilation.

10.5.2 Spill trays, which may be of the dry type or have means of drainage to the EGC residue/ NaOH overflow tank, are to be provided.

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