RULES
FOR THE CLASSIFICATION OF SHIPS

Part 8 – PIPING
January 2021

Amendments No. 2
July 2022

CROATIAN REGISTER OF SHIPPING

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By the decision of the General Committee of Croatian Register of Shipping,

Amendments No. 2 to the
RULES FOR THE CLASSIFICATION OF SHIPS
Part 8 – PIPING

have been adopted on 27th June and shall enter into force on 1st July 2022

INTRODUCTORY NOTES

These amendments shall be read together with the requirements in the Rules for the Classification of Ships, Part 8 – Piping, edition January 2021, as amended by Amendments No. 2, edition January 2022.

Table 1 contains review of amendments, where items changed or added in relating to previous edition are given, with short description of each modification or addition. All major changes throughout the text are shaded.

This Part of the Rules includes the requirements of the following international Organisations:

International Maritime Organization (IMO)

Conventions:	International Convention for the Safety of Life at Sea 1974 (SOLAS 1974) and all subsequent amendments up to and including the 2017 amendments (MSC.421(98)) Protocol of 1988 relating to the International Convention for the Safety of Life at Sea 1974, as amended (SOLAS PROT 1988) International Convention on Load Lines, 1966, as modified by the 1988 Protocol relating thereto and all amendments up to and including 2003 amendments adopted by resolution MSC.143(77) International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) and all subsequent amendments up to and including the 2018 amendments (MEPC.301(72))

International Association of Classification Societies (IACS)

Unified Requirements (UR):	E8 (1996), F2 (1999), F8 (1989), F15 (rev. 6, Feb 2021), F16 (2000), F21 (1974), F22 (1974), F24 (1998), F26 (2000), F33 (1981), F35 (2005), F39 (1999), F41 (1993), F42 (1995), F44 (2010), M11 (1972), M24 (1976), M45 (2011), M57 (1993), M61 (2003), M64 (2004), M65 (2004), M75 (Jan 2021), P1 (2001), P2.1 (Nov 2001), P2.2 (Nov 2001), P2.3 (Nov 2001), P2.4 (1974), P2.5 (Nov 2001), P2.6 (1987), P2.7 (Nov 2001), P2.8 (Nov 2001), P2.7.4 (rev. 10, Jan 2021), P2.8 (Nov 2001), P2.9 (1987), P2.10 (Nov 12001), P2.11 (rev. 5, Jan 2021), P2.12 (rev. 3, Feb 2021), P2.13 (rev. 1, Jan 2021), P3 (rev. 5, Apr 2021), P4 (rev. 6, Feb 2021)
Unified Interpretations (UI):	SC56, SC58, SC99 (2005), SC111 (1995), SC118, SC123 (rev.3, Corr.1 2022), SC140 (1998), SC179 (rev. 3, Feb 2021), SC184 (2005), SC 232 (2009), SC 243 (2012), SC251 (2011), SC 255 (Cor.1 2013), MPC87 (Jan 2007), LL10 (2008), LL11 (2008), LL36 (2008), LL49 (2008), LL52 (2008), LL58 (2008)
Recommendations (Rec.):	Rec. 100 (2008)

TABLE 1 – REVIEW OF AMENDMENTS

This review comprises amendments in relation to the Rules for the Classification of Ships, Part 8 – Piping, edition January 2021, as amended by Amendments No. 2, edition January 2022.

ITEM	*DESCRIPTION OF THE AMENDMENTS*
SECTION 1 – GENERAL	
Head 1.3	Sub-items 1.3.7.4, 13.8.1 and 1.3.8.3 have been amended in order to align with IACS UR P2.7.4, Rev.10 and UR P.2.12, Rev.3
Head 1.7	sub-items 1.7.3.1, 1.7.3.4, 1.7.4.1, 1.7.4.2, 1.7.5.3, 1.7.5.6, 1.7.6.6 and 1.7.6.7 have been amended in order to align with IACS UR P4, Rev.6
Head 1.10	Sub-item 1.10.5.5.6 has been amended in order to align with IACS UR P2.11, Rev.5
Head 1.11	Sub-item 1.11.1.2 has been amended in order to aligh with IACS UR P.2.12, Rev.3
SECTION 2 – BILGE SYSTEM	
Head 2.12	Items 2.12.2 and 2.12.3 have been amended in order to align with IACS UI SC179, Rev.3
SECTION 3 – BALLAST SYSTEM	
Head 3.5	Item 3.5.1 has been amended in order to better align with Rules Pt.9/Annex D. Items 3.5.2, 3.5.3, 3.5.4 and 3.5.5 have been deleted.
SECTION 4 – CARGO PIPING SYSTEM OF OIL TANKERS AND OIL COLLECTING SHIPS	
Head 4.2	Item 4.2.2 has been amended in order to align with IACS UR F15 , Rev.6
SECTION 5 – AIR, GAS VENT, OVERFLOW AND SOUNDING SYSTEMS	
Head 5.1	Sub-items 5.1.6.1 and 5.1.6.12 have been amended in order to align with IACS UR P3, Rev.5
Head 5.2	Items 5.2.1 and 5.2.2 have been amended with sub-items re-enumerated in order to better align with Rules Part 17.
SECTION 6 – EXHAUST GAS SYSTEM	
Head 6.4	Item 6.4.1 has been amended in order to better align with Rules Pt.9/Annex C
SECTION 10 – COOLING WATER SYSTEM	
Head 10.2	Item 10.2.3 has been amended in order to align with IACS UR P2.13, Rev.1

1 GENERAL

■ **Head 1.3 PIPELINES,** sub-items 1.3.7.4, 1.3.8.1 and 1.3.8.3 have been amended and should be read as follows:

1.3.7 Types of connections

1.3.7.4 Mechanical joints

Due to the great variations in design and configuration of mechanical joints, no specific recommendation regarding calculation method for theoretical strength calculations is given in these requirements. The Type Approval is to be based on the results of testing of the actual joints.

These requirements are applicable to pipe unions, compression couplings, slip-on joints as shown in Fig. 1.3.7.4. Similar joints complying with these requirements may be acceptable.

.1 Mechanical joints including pipe unions, compression couplings, slip-on joints and similar joints are to be of approved type for the service conditions and the intended application. Type approval will be performed in accordance with the provision of 1.10 (criterion from *IACS UR P2.11)*.

.2 Where the application of mechanical joints results in reduction in pipe wall thickness due to the use of bite type rings or other structural elements, this is to be taken into account in determining the minimum wall thickness of the pipe to withstand the design pressure.

.3 Materials of mechanical joints is to be compatible with the piping material and internal and external media.

.4 Mechanical joints are to be tested where applicable, to a burst pressure of 4 times the design pressure.
For design pressures above 200 bar the required burst pressure will be specially considered by *Register*.

.5 Where appropriate, mechanical joints are to be of fire resistant type as required by Table 1.3.7.4-10.

.6 Mechanical joints, which in the event of damage could cause fire or flooding, are not to be used in piping sections directly connected to the ship's side below the bulkhead deck of passenger ships and freeboard deck of cargo ships or tanks containing flammable fluids.

.7 The number of mechanical joints in flammable fluid systems is to be kept to a minimum. In general, flanged joints conforming to recognised standards are to be used.

.8 Piping in which a mechanical joint is fitted is to be adequately adjusted, aligned and supported. Supports or hangers are not to be used to force alignment of piping at the point of connection.

.9 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.

.10 Applications of mechanical joints and their acceptable use for each service is indicated in Table 1.3.7.4-10; dependence upon the Class of piping and pipe dimensions is indicated in Table 1.3.7.4-10a.
In particular cases, size in excess of those mentioned above may be accepted by *Register* if in compliance with a recognized national and/or international standard.

.11 Mechanical joints are to be tested in accordance with a program approved by *Register*, which is to include at least the following:
.1 leakage test
.2 vacuum test (where necessary)
.3 vibration (fatigue) test
.4 fire endurance test (where necessary)
.5 burst pressure test
.6 pressure pulsation test (where necessary)
.7 assembly test (where necessary)
.8 pull out test (where necessary)

.12 The installation of mechanical joints is to be in accordance with the manufacturer's assembly instructions. Where special tools and gauges are required for installation of the joints, these are to be supplied by the manufacturer.

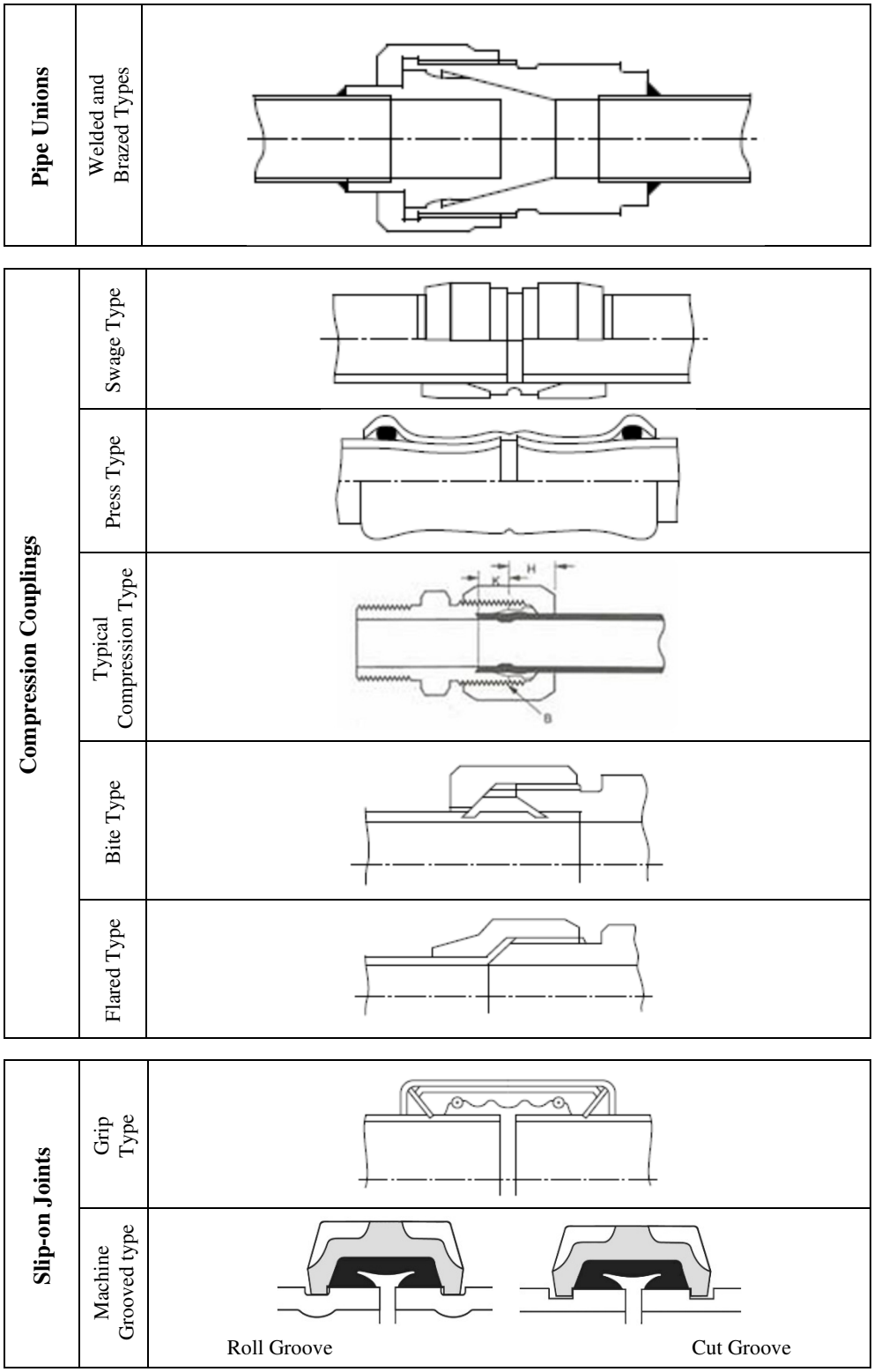


Fig. 1.3.7.4
Examples of mechanical joints

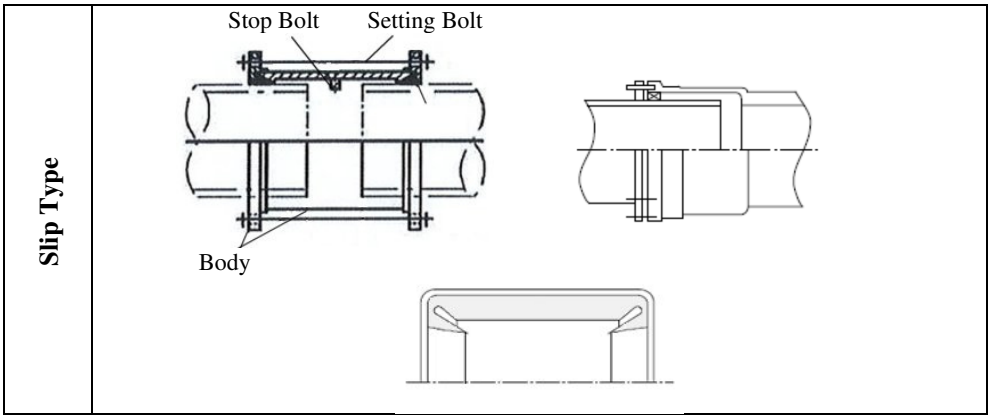


Fig. 1.3.7.4
Examples of mechanical joints

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.

Table 1.3.7.4-10

	Systems	Kind of connections			Classification of pipe system	Fire endurance test condition [7]
		Pipe Unions	Compression Couplings	Slip-on Joints		
	Flammable fluids (Flash point ≤60°C)					
1	Cargo oil lines [1]	+	+	+	dry	30 min dry (*)
2	Crude oil washing lines [1]	+	+	+	dry	
3	Vent lines [3]	+	+	+	dry	
	Inert gas					
4	Water seal effluent lines	+	+	+	wet	30 min wet (*)
5	Scrubber effluent lines	+	+	+	wet	30 min wet (*)
6	Main lines [1&2]	+	+	+	dry	30 min dry (*)
7	Distribution lines [1]	+	+	+	dry	30 min dry (*)
	Flammable fluids (Flash point >60°C)					
8	Cargo oil lines [1]	+	+	+	dry	30 min dry (*)
9	Fuel oil lines [2&3]	+	+	+	wet	30 min wet (*)
10	Lubricating oil lines [2&3]	+	+	+	wet	
11	Hydraulic oil [2&3]	+	+	+	wet	
12	Thermal oil [2&3]	+	+	+	wet	
	Sea water					
13	Bilge lines [4]	+	+	+	dry/wet	8 min dry + 22 min wet (*)
14	Permanent water filled fire extinguishing systems, e.g. fire main, sprinkler systems [3]	+	+	+	wet	30 min wet (*)
15	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
16	Ballast system [4]	+	+	+	wet	30 min wet (*)
17	Cooling water system [4]	+	+	+	wet	30 min wet (*)
18	Tank cleaning services	+	+	+	dry	Fire endurance test not required

Table 1.3.7.4-10 - continued

	Systems	Kind of connections			Classification of pipe system	Fire endurance test condition [7]
		Pipe Unions	Compression Couplings	Slip-on Joints		
19	Non-essential systems	+	+	+	dry dry/wet wet	Fire endurance test not required
	Fresh water					
20	Cooling water system [4]	+	+	+	wet	30 min wet (*)
21	Condensate return [4]	+	+	+	wet	30 min wet (*)
22	Non-essential system	+	+	+	dry dry/wet wet	Fire endurance test not required
	Sanitary/Drains/Scuppers					
23	Deck drains (internal) [5]	+	+	+	dry	Fire endurance test not required
24	Sanitary drains	+	+	+	dry	
25	Scuppers and discharge (overboard)	+	+	-	dry	
	Sounding/Vent					
26	Water tanks/Dry spaces	+	+	+	dry, wet	Fire endurance test not required
27	Oil tanks (f.p. > 60°C) [2&3]	+	+	+	dry	
	Miscellaneous					
28	Starting/Control air [4]	+	+	-	dry	30 min dry (*)
19	Service air (non-essential)	+	+	+	dry	Fire endurance test not required
30	Brine	+	+	+	wet	
31	CO_2 system (outside protected space)	+	+	-	dry	30 min dry (*)
32	CO_2 system (inside protected space)	+	+	-	dry	Mechanical joints shall be constructed of materials with melting point above 925°C. (FSS Code Chapter 5)
33	Steam	+	+	+ [6]	wet	Fire endurance test not required

Abbreviations:
+ Application is allowed
- Application is not allowed
* Fire endurance test as specified in 1.10.5.5.6

Footnotes Table 1.3.7.4-10 - Fire resistance capability
If mechanical joints include any components which readily deteriorate in case of fire, the following footnotes are to be observed:
1. 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 joints 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. Fire endurance test shall be applied when mechanical joints are installed inside machinery spaces of category A.

Footnotes Table 1.3.7.4-10 - General
5. Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.
6. Slip type slip-on joints as shown in Fig.1.3.7.4. 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.

Table 1.3.7.4-10a
Application of mechanical joints depending upon the class of piping

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

Abbreviations:
+ Application is allowed
- Application is not allowed

1.3.8 Flexible hoses (*IACS UR P2.12*)

1.3.8.1 Terms and Definitions

.1 Flexible hose - except otherwise specified, for the purpose of this regulation it generally means any flexible segment of the pipeline, described by terms such as “flexible hose” or “Flexible pipe” made of metallic or non-metallic material.

.2 Flexible hose assembly – 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.

1.3.8.3 Design and construction

.1 Flexible hoses are to be designed and constructed in accordance with recognised National or International standards acceptable to *Register*. Flexible hoses constructed of rubber materials and intended for use in bilge, ballast, compressed air, oil fuel, lubricating, hydraulic and thermal oil systems are to incorporate a single, double or more, closely woven integral wire braid or other suitable material reinforcement.
Flexible hoses of plastics materials for the same purposes, such as Teflon or Nylon, which are unable to be reinforced by incorporating closely woven integral wire braid are to have suitable material reinforcement as far as practicable.
Where rubber or plastics materials hoses are to be used in oil supply lines to burners, the hoses are to have external wire braid protection in addition to the reinforcement mentioned above. Flexible hoses for use in steam systems are to be of metallic construction.

.2 Flexible hoses are to be complete with approved end fittings in accordance with manufacturer’s specification. The end connections that do not have a flange are to comply with 1.3.7.4 as applicable and each type of hose/fitting combination is to be subject to prototype testing to the same standard as that required by the hose with particular reference to pressure and impulse tests.

.3 The use of hose clamps and similar types of end attachments is not acceptable for flexible hoses in piping systems for steam, flammable media, starting air systems or for sea water systems where failure may result in flooding. In other piping systems, the use of hose clamps may be accepted where the working pressure is less than 5 bar and provided there are double clamps at each end connection.

.4 Flexible hose assemblies intended for installation in piping systems where pressure pulses and/or high levels of vibration are expected to occur in service, are to be designed for the maximum expected impulse peak pressure and forces due to vibration. The tests required by 1.3.8.5 are to take into consideration the maximum anticipated in-service pressures, vibration frequencies and forces due to installation.

.5 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 fire-resistant type except in cases where such hoses are installed on open decks, as defined in Regulation 9.2.3.3.2.2(10) of SOLAS Chapter II-2 as amended by IMO resolution up to MSC.421(98) and not used for fuel oil lines. Fire resistance is to be demonstrated by testing to ISO 15540:2016 and ISO 15541:2016 (*see also IACS UR F42*).

.6 Flexible hose assemblies are to be selected for the intended location and application taking into consideration ambient conditions, compatibility with fluids under working pressure and temperature conditions consistent with the manufacturer's instructions and any requirements of *Register*.

■ **Head 1.7 APPLICATION OF PLASTIC PIPES ON SHIPS,** sub-items 1.7.3.1, 1.7.3.4, 1.7.4.1, 1.7.4.2, 1.7.5.3, 1.7.5.6, 1.7.6.6 and 1.7.6.7 have been amended and should be read as follows:

1.7.3 General Requirements

1.7.3.1 Strength

.1 The strength of the pipes is to be determined by a hydrostatic test failure pressure of a pipe specimen under the standard conditions: atmospheric pressure equal to 100 kPa, relative humidity 30%, environmental and carried fluid temperature 298 kPa (25° C).

.2 The strength of fittings and joints is to be not less than that of the pipes.

.3 The nominal pressure is to be determined from the following conditions:

a) INTERNAL PRESSURE - for an internal pressure the following is to be taken whichever is smaller: the following is to be taken whichever is smaller:

$$p_{n,int} \leq \frac{p_{sth}}{4}, \quad \text{or} \quad p_{n,int} \leq \frac{p_{lth}}{2.5}$$

where:
Psth = short-term hydrostatic test pipe failure pressure;
Plth = long-term hydrostatic test pipe failure pressure (> 100,000 h)

b) 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 SOLAS II-1/8-1, as amended, or for any pipes that would allow progressive flooding to other compartments through damaged piping or through open ended pipes in the compartments).
For an external pressure:

$$p_{n,ext} \leq \frac{p_{col}}{3}$$

where:
p_{col} = pipe collapse pressure.
In no case is the pipe collapse pressure to be less than 3 bar.
The maximum working external pressure is a sum of the vacuum inside the pipe and a head of liquid acting on the outside of the pipe.

.4 Notwithstanding the requirements of 3 a) or 3 b) above as applicable, the pipe or pipe layer minimum wall thickness is to follow recognized standards. In the absence of standards for pipes not subject to external pressure, the requirements of 3 b) above are to be met.

.5 The maximum permissible working pressure is to be specified with due regard for maximum possible working temperatures in accordance with Manufacturer's recommendations.

1.7.3.4 Temperature

.1 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 20ºC 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.

.2 The minimum heat distortion/deflection temperature is to be not less than 80ºC.

1.7.4 Requirements for Pipes/Piping Systems Depending on Service and/or Locations

1.7.4.1 Fire Endurance

.1 Pipes and their associated fittings whose integrity is essential to the safety of ships, including plastic piping required by SOLAS II-2/21.4 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 Res A.753(18), as amended by IMO Resolutions MSC. 313(88) and MSC.399(95).

.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.

a) *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 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).

b) *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 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).

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

.3 Permitted uses of piping depending on fire endurance, location and piping system is given in Table 1.7.4.1 "Fire Endurance Requirement Matrix".

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

1.7.4.2 Flame spread

.1 All pipes, except those fitted on open decks and within tanks, cofferdams, 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 MSC.399(95).

.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 Res. A.753(18), as amended by IMO Resolutions MSC.313(88) and MSC.399(95).

.3 Surface flame spread characteristics may also be determined using the text 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.

Table 1.7.4.1-1
Fire Endurance Requirement Matrix

ABBREVIATIONS	
L1	Fire endurance test (appendix 1 of IMO Resolution A.753(18), as amended by IMO Resolutions MSC.313(88) and MSC.399(95)) in dry conditions, 60 min
L1W	Fire endurance test (section 1.7.4.1.2)
L2	Fire endurance test (appendix 1 of IMO Resolution A.753(18), as amended by IMO Resolutions MSC.313(88) and MSC.399(95)) in dry conditions, 30 min
L2W	Fire endurance test (section 1.7.4.1.2)
L3	Fire endurance test (appendix 2 of IMO Resolution A.753(18), as amended by IMO Resolutions MSC.313(88) and MSC.399(95)) in wet conditions, 30 min
0	No fire endurance test required
NA	Not applicable
X	Metallic materials having a melting point greater than 925 °C

Table 1.7.4.1-2

LOCATION DEFINITIONS		
Loc.	**Definition**	**Description**
A	Machinery spaces of category A	Machinery spaces of category A as defined in the *Rules for the classification of ships, Part 7 – Machinery Installation,* 1.2.5.
B	Other machinery spaces and pump rooms	Spaces, other than category A machinery spaces and cargo pump rooms, containing propulsion machinery, boilers, fuel oil units, steam and internal combustion engines, generators, and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces.
C	Cargo pump rooms	Spaces containing cargo pumps and entrances and trunks to such spaces.
D	Ro/Ro cargo holds	Ro-Ro cargo spaces and special category spaces as defined in 3.1.2.41 and 46 of the *Rules for the classification of ships, Part 17 – Fire Protection.*
E	Other dry cargo holds	All spaces other than ro-ro cargo holds used for non-liquid cargo and trunks to such spaces.
F	Cargo Tanks	All spaces used for liquid cargo and trunks to such spaces.
G	Fuel oil Tanks	All spaces used for fuel oil (excluding cargo tanks) and trunks to such spaces.
H	Ballast water tanks	All spaces used for ballast water and trunks to such spaces.
I	Cofferdams, void spaces, pipe tunnel and ducts	Cofferdams and voids are those empty spaces between two bulkheads separating two adjacent compartments.
J	Accommodation service and control spaces	Accommodation spaces, service spaces and control stations as defined in 3.1.2.1; 45 & 18 of the *Rules for the classification of ships, Part 17 – Fire Protection.*
K	Open decks	Open deck spaces as defined in 9.2.2.3.2(5) of the *Rules for the classification of ships, Part 17 – Fire Protection.*

Table 1.7.4.1-3

CARGO (Flammable cargoes - flash point ≤ 60 ºC)												
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
1	Cargo lines	NA	NA	L1	NA	NA	0	NA	0(10)	0	NA	L1(2)
2	Crude oil washing lines	NA	NA	L1	NA	NA	0	NA	0(10)	0	NA	L1(2)
3	Vent lines	NA	NA	NA	NA	NA	0	NA	0(10)	0	NA	X

Table 1.7.4.1-4

INERT GAS												
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
4	Water seal effluent line	NA	NA	0(1)	NA	NA	0(1)	0(1)	0(1)	0(1)	NA	0
5	Scrubber effluent line	0(1)	0(1)	NA	NA	NA	NA	NA	0(1)	0(1)	NA	0
6	Main line	0	0	L1	NA	NA	NA	NA	NA	0	NA	L1(6)
7	Distribution lines	NA	NA	L1	NA	NA	0	NA	NA	0	NA	L1(2)

Table 1.7.4.1-5

LIQUIDS (flash point > 60°C)												
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
8	Cargo line	X	X	L1	X	X	NA(3)	0	0(10)	0	NA	L1
9	Fuel oil	X	X	L1	X	X	NA(3)	0	0	0	L1	L1
10	Lubricating	X	X	L1	X	X	NA	NA	NA	0	L1	L1
11	Hydraulic oil	X	X	L1	X	X	0	0	0	0	L1	L1

Table 1.7.4.1-6

SEAWATER [1]											
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
12	Bilge main and branches	L1[7]	L1[7]	L1	X	X	NA	0	0	0	NA	L1
13	Fire main and water spray	L1	L1	L1	X	NA	NA	NA	0	0	X	L1
14	Foam system	L1W	L1W	L1W	NA	NA	NA	NA	NA	0	L1W	L1W
15	Sprinkler system	L1W	L1W	L3	X	NA	NA	NA	0	0	L3	L3
16	Ballast	L3	L3	L3	L3	X	0[10]	0	0	0	L2W	L2W
17	Cooling water, essential services	L3	L3	NA	NA	NA	NA	NA	0	0	NA	L2W
18	Tank cleaning services, fixed machines	NA	NA	L3	NA	NA	0	NA	0	0	NA	L3[2]
19	Non-essential systems	0	0	0	0	0	NA	0	0	0	0	0

Table 1.7.4.1-7

FRESHWATER											
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
20	Cooling water, essential services	L3	L3	NA	NA	NA	NA	0	0	0	L3	L3
21	Condensate return	L3	L3	L3	0	0	NA	NA	NA	0	0	0
22	Non-essential systems	0	0	0	0	0	NA	0	0	0	0	0

Table 1.7.4.1-8

SANITARY / DRAINS / SCUPPERS											
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
23	Deck drains (internal)	L1W[4]	L1W[4]	NA	L1W[4]	0	NA	0	0	0	0	0
24	Sanitary drains (internal)	0	0	NA	0	0	NA	0	0	0	0	0
25	Scuppers and discharges (overboard)	0[1,8]	0[1,8]	0[1,8]	0[1,8]	0[1,8]	0	0	0	0	0[1,8]	0

Table 1.7.4.1-9

SOUNDING / AIR											
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
26	Water tanks/dry spaces	0	0	0	0	0	0[10]	0	0	0	0	0
27	Oil tanks (flash point > 60°C)	X	X	X	X	X	X[3]	0	0[10]	0	X	X

Table 1.7.4.1-10

MISCELLANEOUS												
No.	**Piping system**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
28	Control air	L1(5)	L1(5)	L1(5)	L1(5)	L1(5)	NA	0	0	0	L1(5)	L1(5)
29	Service air (non-essential)	0	0	0	0	0	NA	0	0	0	0	0
30	Brine	0	0	NA	0	0	NA	NA	NA	0	0	0
31	Auxiliary low pressure steam (≤ 7 bar)	L2W	L2W	0(9)	0(9)	0(9)	0	0	0	0	0(9)	0(9)
32	Central vacuum cleaners	NA	NA	NA	0	NA	NA	NA	NA	0	0	0
33	Exhaust Gas Cleaning System Effluent Line	L3(1)	L3(1)	NA	NA	NA	NA	NA	NA	NA	L3(1,11) NA	NA
34	Urea Transfer/ Supply System (SCR installations)	L1(12)	L1(12)	NA	NA	NA	NA	NA	NA	0	L3(11) NA	0

Table 1.7.4.1-11

FOOTNOTES	
1	Where non-metallic piping is used, remotely controlled valves to be provided at ship's side (valve is to be controlled from outside space).
2	Remote closing valves to be provided at the cargo tanks.
3	When cargo tanks contain liquids with flash point >60 C, "0" may replace "NA" or "X".
4	For drains serving only the space concerned, "0" may replace "L1W".
5	When controlling functions are not required by statutory requirements or guidelines "0" may replace "L1".
6	For pipe between machinery space and deck water seal, "0" may replace "L1".
7	For passenger ships, "X" is to replace "L1".
8	Scuppers serving open decks in positions 1 and 2, as defined in Regulation 13 of Protocol of 1988 relating to the International Convention on Load Lines, 1966, as amended, 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 ships whistle, "X" is to replace "0".
10	For tankers where compliance with paragraph 6 of regulation 19 of MARPOL Annex I, as amended 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-2/21.4 (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.

1.7.5 Material Approval and Quality Control During Manufacture

1.7.5.3 The Manufacturer is to have quality system that meets ISO 9000:2015 or equivalent. The quality system is to consist of elements necessary to ensure that pipes and fittings are produced with consistent and uniform mechanical and physical properties.

1.7.5.6 In case the Manufacturer does not have an approved quality system complying with ISO 9000:2015 or equivalent, pipes and fittings are to be tested in accordance with this Section to the satisfaction of the surveyors of the *Register* for every batch of pipes.

1.7.6 Installation

1.7.6.6 Application of Fire Protection Coatings

.1 Fire protection coatings are to be applied on the joints, where necessary for meeting the required fire endurance as for 1.7.4.1.3, after performing hydrostatic pressure tests of the piping system.

.2 The fire protection coatings are to be applied in accordance with Manufacturer's recommendations, using a procedure approved in each particular case.

1.7.6.7 Penetration of Divisions

.1 Where plastic pipes pass through "A" or "B" class divisions, arrangements are to be made to ensure that the fire endurance 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.

.2 When plastic pipes pass through watertight bulkheads or decks, the watertight integrity of the bulkhead or deck is to be maintained. For pipes not able to satisfy the requirements in 1.7.3.1.3 b), a metallic shut-off valve operable from above the freeboard deck should be fitted at the bulkhead or deck.

.3 If the bulkhead or deck is also a fire division and destruction by fire of plastic pipes may cause the inflow of liquid from tanks, a metallic shut-off valve operable from above the freeboard deck should be fitted at the bulkhead or deck.

■ **Head 1.10 TYPE APPROVAL OF MECHANICAL JOINTS (IACS UR P2.11),** sub-item 1.10.5.5.6 has been amended and should be read as follows:

1.10.5 Testing, procedures and requirements

1.10.5.5.6 Fire endurance test shall be carried out in order to establish capability of the mechanical joints to withstand effects of fire which may be encountered in service. The fire endurance test is to be conducted on the selected test specimens as per the following standards.

a) ISO 19921: 2005(E): Ships and marine technology – Fire resistance of metallic pipe components with resilient and elastomeric seals – Test methods

b) ISO 19922: 2005(E): Ships and marine technology – Fire resistance of metallic pipe components with resilient and elastomeric seals – Requirements imposed on the test bench.

Clarifications to the standard requirements in ISO 19921:2005, Paragraphs 7.2, 7.4, 7.6 and 7.7:

1. If the fire test is conducted with circulating water at a pressure different from the design pressure of the joint (however of at least 5 bar) the subsequent pressure test is to be carried out to 1.5 times the design pressure.
2. If the fire test is required in Table 1.3.7.4-10 to be “8 min dry + 22 min wet” or “30 min dry”, i.e. conducted for a period of time without circulating of water, the following test conditions apply:
   Test condition “8 min dry + 22 min wet”
   The test piece is not required to be rinsed with the test medium (water) in preparation for the test as required in Paragraph 7.2 of ISO 19921:2005. The exposure to fire is to be started and continued for 8 minutes with the sample dry; after 8 minutes of dry test condition the piping system is to be filled with water and test pressure is to be increased up to at least 5 bar within 2 minutes, then maintained to at least 5 bar. After further 22 minutes (i.e. 30 minutes from initial exposure to fire) the exposure to fire is to be stopped and a hydrostatic pressure test as specified in 1. is to be carried out.
   Test condition “30 min dry”
   The exposure to fire is to be started and continued for 30 minutes with the sample dry. After 30 minutes the exposure to fire is to be stopped and a hydrostatic pressure test as specified in 1. is to be carried out.
   Note
   For fire tests in dry condition the pressure inside the test specimen is to be monitored for a rise due to heating of the enclosed air. Means of pressure relief should be provided where deemed necessary.
   High pressures created during this test can result in failure of the test specimen. Precautions shall be taken to protect personnel and facilities.
   Paragraph 7.5 of ISO 19921:2005 does not apply to the dry tests and no forced air circulation is to be arranged.
   For fire endurance test requiring exposure time greater than 30 minutes test conditions are adjusted to meet the extended required total exposure time. In all cases for dry-wet test the minimum dry test exposure time is 8 minutes.
3. A selection of representative nominal bores may be tested in order to evaluate the fire resistance of a series or range of mechanical joints of the same design.
   When a mechanical joint of a given nominal bore (D_n) is so tested then other mechanical joints falling in the range D_n to 2 x D_n (both inclusive) are considered accepted.
4. Alternative test methods and/or test procedures considered to be at least equivalent may be accepted at the discretion of the *Register* in cases where the test pieces are too large for the test bench and cannot be completely enclosed by the flames.
5. Where thermal insulation is acceptable as a means of providing fire resistance, following requirements apply:
   .1 Thermal insulation materials applied on couplings are to be non-combustible according to ISO 1182:2010 as required by the Fire Test Procedures Code defined in Regulation 3 of SOLAS Chapter II-2 as amended by IMO resolutions up to MSC.421(98).
   Precautions are to be taken to protect the insulation from being impregnated with flammable oils.

.2 At least the fire endurance and the vibration testing in table 1.10.5.2 are to be carried out with thermal insulation in place.

.3 A service restriction is to be stated on the type approval certificate that the mechanical joints are to be fitted with thermal insulation during the installation in cases where the mechanical joints are used where fire resistance is required, unless mechanical joints are delivered already fitted with thermal insulation before installation.

■ **Head 1.11 TESTS OF FLEXIBLE HOSE ASSEMBLIES (IACS UR P2.12.5),** sub-item 1.11.1.2 has been amended and should be read as follows:

1.11.1 Tests

1.11.1.2 The tests are, as applicable, to be carried out on different nominal diameters of hose type complete with end fittings for pressure, burst, impulse resistance and fire resistance in accordance with the requirements of the relevant standard. The following standards are to be used as applicable.

- ISO 6802:2018 - Rubber and plastics hoses and hose assemblies with wire reinforcements - 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 - Pipework - Corrugated metal hoses and hose assemblies.

Other standards may be accepted where agreed by *Register*.

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.

2 BILGE SYSTEM

■ **Head 2.12 SPECIFIC REQUIREMENTS FOR DRAINAGE OF FORWARD SPACES IN BULK, ORE AND COMBINATION CARRIERS ("dewatering system"),** items 2.12.2 and 2.12.3 have been amended and should be read as follows:

2.12.2 The bilge of dry spaces any part of which extends forward of the foremost cargo hold, as well as the means for draining and pumping ballast tanks forward of the collision bulkhead, is to be capable of being brought into operation from the navigation bridge, the propulsion machinery control position or readily accessible enclosed space, the location of which is accessible from the navigation bridge or propulsion machinery control position without traversing exposed freeboard or superstructure decks. The following criteria are to govern the application of the requirement:

.1 A position which is accessible via an under deck passage, a pipe trunk or other similar means of access is not to be taken as being in the readily accessible enclosed space.

.2 The requirement does not apply to the enclosed spaces the volume of which does not exceed 0,1% of the ship maximum displacement volume and to the chain locker.

2.12.3 The water level detectors, giving an audible and visual alarm located on the navigation bridge, are to be fitted:

.1 In any ballast tank forward of the collision bulkhead, indicating when the liquid in the tank reaches a level not exceeding 10% of the tank capacity. An alarm overriding device may be installed to be activated when the tank is in use.

.2 In any dry or void space which is to comply with the requirements in 2.12.2, giving the alarm at a water level of 0,1 m above the deck.

3 BALLAST SYSTEM

■ **Head 3.5 BALLAST WATER MANAGEMENT SYSTEMS,** item 3.5.1 has been amended and should be read as follows:

3.5.1 In addition to the requirements contained in BWM Convention (2004), the requirements set forth in *Rules for the classification of ships, Part 9 – Machines,* ANNEX D (see *IACS UR M74* also) are to be complied with.

Unless instructed otherwise, the requirements in this Section shall be applied in conjunction with the applicable requirements in *the Rules for technical supervision of sea-going ships, Part 22 - Pollution prevention, Section 10*.

This Section is not applied to ship's ballast water systems including piping valves, pumps, etc. where the BWMS is not fitted.

This Section is to be read in conjunction with requirements of the *Rules for the classification of ships, Part 17 – Fire protection*, ANNEX VI (see also *IACS UR F45*).

4 CARGO PIPING SYSTEM OF OIL TANKERS AND OIL COLLECTING SHIPS

■ **Head 4.2 PIPING ARRANGEMENT,** item 4.2.2 has been amended and should be read as follows:

4.2.2 Pipelines not intended to serve cargo tanks and slop tanks (see the *Rules for technical supervision of sea-going ships, Part 22 - Pollution prevention,* 2.1.2.20) shall not pass through these tanks and shall have no communication with them.

Segregated and clean ballast lines are permitted to be carried through cargo tanks as well as pipelines serving cargo tanks which are permitted to be carried through segregated and clean ballast tanks, provided the following requirements are fulfilled:

.1 The pipes are to be of heavy gauge steel of minimum wall thickness according to the table thereunder with welded or heavy flanged joints the number of which is to be kept to a minimum.
Minimum wall thickness of these pipes has to be determined in depend of nominal diameter (ND), and shall not be less than listed below:

- ND ≤ 50 [mm] 6,3 [mm]
- ND ≤ 100 [mm] 8,6 [mm]
- ND ≤ 125 [mm] 9,5 [mm]
- ND ≤ 150 [mm] 11,0 [mm]
- ND > 150 [mm] 12,5 [mm]

The thickness shown in the above table refers to carbon steel. For pipes of other material, minimum wall thickness is determined in agreement with the *Register.*

.2 Provision shall be made for expansion compensation of pipes within the tanks. Expansion bends only (not glands) are permitted for this purpose.

.3 Connection between cargo piping and ballast piping referred to above is not permitted. 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 non-return valves should be fitted on the segregated ballast connections to prevent the passage of oil to the ballast tanks. Shut-off valves shall be provided to shut off the cargo and ballast lines before the spool piece is removed. 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.

.4 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.
The requirement is not mandatory for tankers for oil with flashpoint > 60ºC.

Air and sounding pipes of fuel oil tanks may pass through the cargo tanks, provided they have no detachable connections, and efficiently secured and protected against mechanical damage. The wall thickness of these pipes shall be not less than indicated in Table 1.3.4.3, column D.

5 AIR, GAS VENT, OVERFLOW AND SOUNDING SYSTEMS

■ **Head 5.1 AIR PIPES,** Sub-items 5.1.6.1 and 5.1.6.12 have been amended and should be read as follows:

5.1.6 Air pipe closing devices

5.1.6.1 Air pipe closing devices where required by the Rules or the International Convention on Load Lines, 1966 or the Protocol of 1988 relating to the International Convention on Load Lines 1966, as amended by IMO resolutions up to MSC.375(93), shall be permanently fixed and fitted with automatic closing devices of an approved type.

Each type and size of air pipe automatic closing device is to be surveyed and type tested at the manufacturer's works or other acceptable location for the *Register*.

Type testing is to include at least the scope of minimum test requirements for an air pipe automatic closing device as given in 5.1.6.12 – 14 (*IACS UR P3*).

5.1.6.12 Further requirements of this item shall apply to Type Testing of Air Pipe Automatic Closing Devices (*see also IACS UR P3*).

Each type and size of air pipe automatic closing device is to be surveyed and type tested at the manufacturer's works or other acceptable location according to the *Register*'s practice. The minimum test requirements for an air pipe automatic closing device are to include the following:

a) Determination of the Flow Characteristics. The flow characteristics of the air pipe closing device are to be determined. Measuring of the pressure drop versus rate of volume flow is to be carried out using water and with any intended flame or insect screens in place.

b) Tightness test during immersion / emerging in water.
An automatic closing device is to be subjected to a series of tightness tests involving not less than two (2) immersion cycles under each of the following conditions:
   i) The automatic closing device is to be submerged slightly below the water surface at a velocity of approximately 4 m/min. and then returned to the original position immediately. The quantity of leakage is to be recorded.
   ii) The automatic closing device is to be submerged to a point slightly below the surface of the water. The submerging velocity is to be approximately 8 m/min and the air pipe vent head is to remain submerged for not less than 5 minutes. The quantity of leakage shall be recorded.
   iii) Each of the above tightness tests shall be carried out in the normal position as well as at an inclination of 40 degrees under the strictest conditions for the device. In cases where such strictest conditions are not clear, tests shall be carried out at an inclination of 40 degrees with the device opening facing in three different directions - upward, downward, sideways (left or right). See Fig. 5.1.6.12-1 to 5.1.6.12-4.

Figure 5.1.6.12-1: Example of normal position

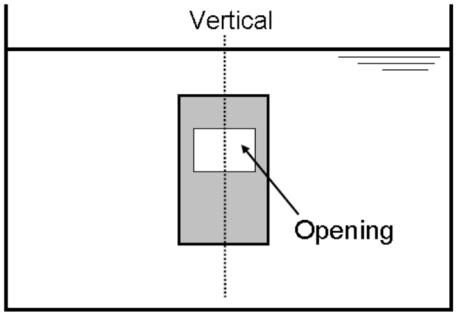


Figure 5.1.6.12-2: Example of inclination 40 degrees opening facing upward

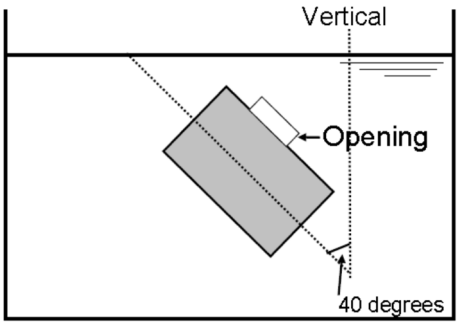


Figure 5.1.6.12-3: Example of inclination 40 degrees opening facing downward

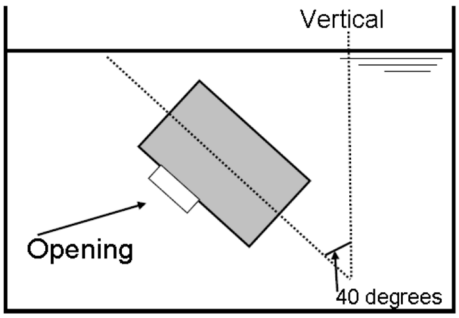
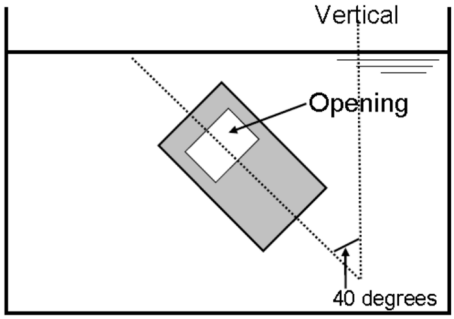


Figure 5.1.6.12-4: Example of inclination 40 degrees opening facing sideways



The maximum allowable leakage per cycle shall not exceed 2 ml/mm of nominal diameter of inlet pipe during any individual test.

c) Discharge / Reverse flow test

The air pipe head shall allow the passage of air to prevent excessive vacuum developing in the tank.

i) Reverse flow test

1) A reverse flow test shall be performed. A vacuum pump or another suitable device shall be connected to the opening of the air pipe leading to the tank. The flow velocity shall be applied gradually at a constant rate until the float gets sucked and blocks the flow.; and
2) The velocity at the point of blocking shall be recorded. 80% of the value recorded will be stated in the certificate.

ii) Alternative to the reverse flow test

1) For pipe heads of 400 mm nominal diameter and above, as an alternative to the reverse flow test, a numerical simulation test based on computational fluid dynamics (CFD), to be carried out in conjunction with limited representative testing to establish the validity of the CFD modelling and results, may be accepted;
2) CFD predictions for air pipe heads can be validated against the available actual reverse flow test results of same size and type of air pipe heads;
3) The accuracy of the CFD modelling and the major assumptions used for the calculation are to be documented;
4) Mesh convergence studies are to be carried out and documented; and
5) The requirement as per the preceding i) 2) applies.

■ **Head 5.2 CARGO TANK VENTING, PURGING AND GAS-FREEING,** Items 5.2.1 and 5.2.2 have been amended and should be read as follows:

5.2.1 Cargo tank venting

5.2.1.1 All cargo tanks are to be provided with a venting system appropriate to the cargo being carried on the ship. Cargo tanks venting system shall fully comply with the applicable requirements set forth in the *Rules for the classification of ships, Part 17 – Fire protection*, 4.5.3, 4.5.6 and 11.6.

The requirements of this regulation are not applicable to the cargo tanks venting system on tankers engaged exclusively in the carriage of cargoes with flash point above 60 °C.

5.2.1.2 When calculating the capacity of the tank venting system, the pressure drop across flame arresting devices, if fitted, shall be increased relative to the pressure drop of the device(s) in clean conditions. Recommended guidance for this increase is 50% of value for the flame arresters in clean conditions.

5.2.1.3 The venting system should be designed to take into consideration the maximum permissible loading/discharging rate for each cargo tank and in the case of a combined venting system, for each group of tanks.

5.2.1.4 Slop tanks are to be equipped with the same venting arrangements as cargo tanks.

5.2.1.5 For ships below 500 GT navigating in restricted areas 5 to 8, unless expressly provided otherwise, the application of this requirement is subject to special consideration by the *Register* in each particular case.

5.2.2 Cargo tank purging and/or gas-freeing

5.2.2.1 Arrangements for purging and/or gas-freeing shall be such as to minimize the hazards due to dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank. Cargo tanks purging and/or gas-freeing arranagement shall fully comply with the applicable requirements set forth in the *Rules for the classification of ships, Part 17 – Fire protection*, 4.5.6 and 16.3.2.

The requirements of this regulation are not applicable to tankers engaged exclusively in the carriage of cargoes with flash point above 60 °C.

5.2.2.2 Cargo tanks venting and gas-freeing arrangement on chemical tankers shall comply with requirements in the *Rules for the classification of ships, Part 27 -Chemical Tankers*, 8.

5.2.2.3 Inert gas system, if installed, shall comply with requirements in the *Rules for the classification of ships, Part 17 - Fire Protection,* 4.5.5, 4.5.6, 16.3.2 and 16.3.3.

6 EXHAUST GAS SYSTEM

■ **Head 6.4 ADDITIONAL REQUIREMENTS FOR EXHAUST GAS TREATMENT SYSTEMS,** item 6.4.1 has been amended and should be read as follows:

6.4.1 In general, the exhaust gas treatment systems are to be designed, arranged and installed in accordance with relevant IMO Guidelines regarding environmental performance of equipment such as Exhaust gas cleaning systems (ECGS) and Selective catalytic reduction (SCR) systems.

Relevant requirements, being mandatory for classification also, are given in the following documents of the *Register*, being available upon request:

.1 QW142 - EXHAUST GAS CLEANING SYSTEMS - SOx SCRUBBERS.
.2 QW143 - SELECTIVE CATALYTIC REDUCTION SYSTEMS.
.3 QW144 - EXHAUST GAS RECIRCULATION SYSTEMS- EGR.

Additionally, refer to the *Rules for the classification of ships, PART 9 – Machines,* ANNEX B - STORAGE AND USE OF SCR REDUCTANTS (see *IACS UR M77* also) and ANNEX C (see *IACS UR M81* also).

10 COOLING WATER SYSTEM

■ **Head 10.2 PIPING ARRANGEMENT,** item 10.2.3 has been amended and should be read as follows:

10.2.3 Seawater pipes in cargo holds for dry cargoes, including cargo spaces of container ships, ro-ro ships, are to be protected from impact of cargo where they are liable to be damaged.