1.4 Symbols and units

1.4.1 The following symbols and related units are commonly used in this Section. Additional symbols, related to some formulae indicated in this Section, are listed wherever it is necessary.

p : Design pressure, in MPa

T : Design temperature, in °C

t : Rule required minimum thickness, in mm

D : Pipe external diameter, in mm.

1.5 Class of piping systems

1.5.1 Purpose of the classes of piping systems

Piping systems are subdivided into three classes, denoted as class I, class II and class III, for the purpose of acceptance of materials, selection of joints, heat treatment, welding, pressure testing and the certification of fittings.

1.5.2 Definitions of the classes of piping systems

a) Classes I, II and III are defined in Tab 3

b) The following systems are not covered by Tab 3:

- cargo piping for oil tankers, gas tankers and chemical tankers, and
- fluids for refrigerating plants.

Table 3 : Class of piping systems

Media conveyed by the piping system	Class I	Class II **(1)** **(4)**	Class III **(7)**
Toxic media	without special safeguards **(3)**	not applicable	not applicable
Corrosive media	without special safeguards **(3)**	with special safeguards **(3)**	not applicable
Flammable media: • heated above flashpoint, or • having flashpoint < 60°C Liquefied gas	without special safeguards **(3)**	with special safeguards **(3)**	not applicable
Oxyacetylene	irrespective of p	not applicable	not applicable
Steam	p > 1,6 or T > 300	other **(2)**	p ≤ 0,7 and T ≤ 170
Thermal oil	p > 1,6 or T > 300	other **(2)**	p ≤ 0,7 and T ≤ 150
Fuel oil **(8)** Lubricating oil Flammable hydraulic oil **(5)**	p > 1,6 or T > 150	other **(2)**	p ≤ 0,7 and T ≤ 60
Other media **(5)** **(6)**	p > 4 or T > 300	other **(2)**	p ≤ 1,6 and T ≤ 200

(1) Valves under static pressure on oil fuel tanks or lubricating oil tanks belong to class II.

(2) Pressure and temperature conditions other than those required for class I and class III.

(3) Safeguards for reducing leakage possibility and limiting its consequences:
e.g. pipes led in positions where leakage of internal fluids will not cause a potential hazard or damage to surrounding areas which may include the use of pipe ducts, shielding, screening etc.

(4) Valves and fittings fitted on the ship side and collision bulkhead belong to class II. See also [20.5.3] b).

(5) Steering gear hydraulic piping system belongs to class I irrespective of p and T.

(6) Including water, air, gases, non-flammable hydraulic oil, urea for SCR systems, when piping materials selected according to ISO 18611-3:2014 for urea in SCR .

(7) The open ended pipes, irrespective of T, generally belong to class III (as drains, overflows, vents, exhaust gas lines, boiler escape pipes, etc.).

(8) Design pressure for fuel oil systems is to be determined in accordance with Tab 4.

Note 1: p : Design pressure, as defined in [1.3.2], in MPa.

Note 2: T : Design temperature, as defined in [1.3.3], in °C.

Note 3: Flammable media generally include the flammable liquids as oil fuel, lubricating oil, thermal oil and flammable hydraulic oil.

Table 4 : Definition of the design pressure for fuel oil systems

Working pressure P, in bar	Working temperature T, in °C	
	T ≤ 60	T > 60
P ≤ 7	3 bar or max. working pressure, whichever is the greater	3 bar or max. working pressure, whichever is the greater
P > 7	max. working pressure	14 bar or max. working pressure, whichever is the greater