

Table 5 : Conditions of use of metallic materials in piping systems

Material	Allowable classes	Maximum design temperature (1)	Particular conditions of use
Carbon and carbon-manganese steels	III, II, I	400 (2)	Class I and II pipes are to be seamless drawn pipes (3)
Copper and aluminium brass	III, II, I	200	<ul style="list-style-type: none"> Not to be used in fuel oil systems, except for class III pipes of a diameter not exceeding 25 mm not passing through fuel oil tanks Not to be used for boiler blow-down valves nor for associated pieces for connection to the shell plating (4)
Copper-nickel	III, II, I	300	
Special high temperature resistant bronze	III, II, I	260	
Stainless steel	III, II, I	300	In general, austenitic stainless steel is not to be used for sea water systems (see Note (6))
Spheroidal graphite cast iron/Nodular cast iron	III, II (5)	350	<ul style="list-style-type: none"> Minimum elongation is not to be less than 12% on a gauge length of $5,65.S^{0.5}$, where S is the actual cross-sectional area of the test piece Not to be used for boiler blow-down valves nor for associated pieces for connection to the shell plating
Grey cast iron/ Ordinary cast iron	III, II	220	<p>Grey cast iron/ordinary cast iron is not to be used for the following systems:</p> <ul style="list-style-type: none"> boiler blow-down systems and other piping systems subject to shocks, high stresses and vibrations bilge lines in tanks parts of scuppers and sanitary discharge systems located next to the hull below the freeboard deck or for passengers ships below the bulkhead deck ship side valves and fittings valves fitted on the collision bulkhead valves fitted to fuel oil and lubricating oil tanks under static pressure head class II fuel oil systems and thermal oil systems
Aluminium and aluminium alloys	III, II	200	<p>Aluminium and aluminium alloys are not to be used on the following systems:</p> <ul style="list-style-type: none"> flammable oil systems sounding and air pipes of fuel oil tanks fire-extinguishing systems bilge system in boiler or machinery spaces or in spaces containing fuel oil tanks or pumping units scuppers and overboard discharges except for pipes led to the bottoms or to the shell above the freeboard deck or fitted at their upper end with closing means operated from a position above the freeboard deck boiler blow-down valves and pieces for connection to the shell plating

- (1) Maximum design temperature is not to exceed that assigned to the class of piping.
- (2) Higher temperatures may be accepted if metallurgical behaviour and time dependent strength (ultimate tensile strength after 100 000 hours) are in accordance with national or international standards or specifications and if such values are guaranteed by the steel manufacturer.
- (3) Pipes fabricated by a welding procedure approved by the Society may also be used.
- (4) Pipes made of copper and copper alloys are to be seamless.
- (5) Use of spheroidal cast iron / nodular cast iron for class I piping systems will be given special consideration by the Society.
- (6) Austenitic stainless steels including grades 304, 304L, 316 and 316L are not considered suitable for use in seawater piping systems. Other types of stainless steel with higher contents of chromium, molybdenum and nitrogen may be considered if a technical justification considering critical factors (e.g. chemical composition, stagnant sea water, or low flow sea water piping, operational consideration, etc.) is provided. This includes austenitic stainless steels with at least 3% molybdenum and duplex ferritic-austenitic stainless steels such as grades UNS S31803 or UNS S2550.