GOST 22786-77 SEAMLESS BIMETAL TUBES FOR SHIPBUILDING

Tubes to this standard shall be seamless bimetal with the outside layer made of steel and the inside layer made of copper.

Tube size range (mm) is given in Table 1.

Table 1 Size range of tubes, mm

Outside diameter	Wall thickness						
	1.5	2.0	2.5	3.0	3.5	4.0	5.0
6	+	-	-	-	-	-	-
9	+	-	-	-	-	-	-
10	-	+	-	-	-	-	-
14	+	+	+	-	-	-	-
18	+	+	+	+	-	+	-
22	-	+	-	+	+	+	-
25	-	+	+	+	-	+	+
28	+	+	-	-	+	+	-
32	+	+	-	+	+	+	-
38	+	+	+	-	+	-	-
42	-	+	-	-	-	-	+
45	-	+	+	-	-	-	+
50	-	+	-	-	-	-	+
55	-	-	+	-	-	-	-

Notes.

1. Other sizes are available on request.
2. Wall thickness includes thicknesses of the two layers.
3. "+" available; "-" not available.

Tubes shall be delivered in different lengths: random 3 to 9 meters with not over 20 % of tubes of 1.5 to 3.0 meters in a lot; specified up to 7 meters or its multiple.

Limit tolerance for length shall be not over 10 mm with 5 mm allowance per cut for multiple lengths.

Limit tolerances for outside diameter of tubes are given in Table 2.

Table 2

Наружный диаметр труб, мм Outside diameter, mm	Предельные отклонения, мм Limit tolerance, mm
До 10 включительно Up to 10 incl.	±0.25
Свыше 10 до 40 включительно Over 10 to 40 incl.	±0.30
Более 40 Over 40	±0.8 %

Limit tolerance for wall thickness shall not be over 10 %.

Thickness of the inside layer and limit tolerance for the outside layer depending on steel grade shall not be over those given in Table 3.

Tube ovality and wall thickness variation shall leave tube sizes within specified limits for OD and w.t.

Tube curvature shall not be over 1.5 mm per meter length.

Table 3 Thickness of inside layer of bimetal tubes, mm

Марка стали наружного слоя	Толщина стенки трубы	Толщина внутреннего слоя	Предельные отклонения
Steel grade of outside layer	Wall thickness	Thickness of inside layer	Limit tolerance
12ХН3А	До 2.5 включ. Up to 2.5 incl.	0.5	±0.20
	Свыше 2.5 Over 2.5	0.8	+0.25 -0.20
10, 20	1.5	0.7	±0.30
	2.0	0.7	+0.40 -0.30
	2.5	0.8	+0.45 -0.40
	3.0 и более 3.0 and over	0.9	+0.45 -0.50

Technical requirements.

Tubes shall be delivered in heat treated condition. Chemical composition of the outside layer of tubes shall conform to GOST 4543-71 (steel grade 12HN3A) or GOST 1050-88 (steel grade 10 and 20).

The inside layer shall be of copper (grade M3P) to GOST 859-78.

Tubes to this standard shall withstand hydraulic tests under pressure P calculated from the formula given in GOST 3865-75 for bimetal tubes.

Tube ends shall be cut square and deburred.

Mechanical properties of tube metal are given in Table 4.

Tube surface shall be free of cracks, laps, deep scratches and indentations, scale and pickling marks.

Traces of copper are permissible on the outside surface.

Temper, colours are permissible on the inside surface.

Each tube length undergoes visual inspection.

Table 4 Mechanical properties of tube metal, (not lower)

Steel grade	Tensile strength, MPa	Yield point, MPa	Elongation, %
12XH3A	-	362	22
10	294	-	25
20	323	-	20

Tube lot size for tubes with OD over 20 mm is not over 250 pieces and not over 300 pieces for OD under 20 mm.

Inside layer thickness is checked in 5 % of tubes from each lot, but not fewer than 5 tube lengths.