

GOST 21945-76 SEAMLESS HOT-FINISHED TUBES OF TITANIUM-BASED ALLOYS

Size range of tubes to this standard is given in Table 1.

Table 1 Size range of tubes, mm

OD	Wall thickness	OD	Wall thickness
83	6; 7; 8; 9; 10; 11; 12	203	9-26; 27
89	6-12; 13; 14	219	9-27
95	6-14	245	10-27; 28; 29; 30
102	6-14; 15; 16; 17; 18; 19; 20	273	10-30
108	6-20; 21; 22	325	12-30
114	6-22; 23; 24	351	12-30; 31; 32; 33; 34; 35; 36; 37; 38; 39; 40; 41; 42; 43; 44; 45; 46; 47; 48; 49; 50; 51; 52; 53; 54; 55; 56; 57; 58; 59; 60; 61; 62; 63; 64; 65
121	6-24; 25		
127	6-25		
133	6-25		
140	6-25		
146	7-22		
152	7-22	377	12-65
159	7-22	402	12-65
168	8-22	426	15-65
180	8-25; 26	465	16-65
194	8-26	480	20-65

Notes.

1. On agreement tubes of 83, 89 and 95 mm diameter and wall thickness 6 and 7 mm and tubes of 325 mm diameter shall have machined surface.
2. Tubes group B (see below) shall have wall thickness 10 mm and over.

Tube length is given below:

- random;
- 1.5 to 6 metres for OD 83 to 325 mm;
- 2.0 to 4.5 meters for OD 351 to 480 mm;
- specified depending on wall thickness and customer's request;
- multiple within specified with 10 mm allowance per cut.

Limit tolerances are given in Table 2.

Table 2

Outside diameter, mm	Limit tolerance, % for outside diameter for accuracy levels		Wall thick- ness, mm	Limit tolerance, % for wall thickness for accuracy levels	
	normal	improved		normal	improved
83-180	+1.0 -2.5	+1.0 -2.0	6-15	+15.0 -20.0	±15.0
194-325	+1.0 -2.0	+0.8 -1.8	Св. 15	±15.0	±12.5
351-480	±1.5	+1.0 -1.2			

Other tolerances are possible on request.

Tube curvature per meter length shall be as follows:

- 2.5 mm for wall thickness below 20 mm;
- 4.0 mm for wall thickness over 20 mm.

Technical requirements.

Tubes shall be produced of alloys VT1-0, PT7-M, PT-3V, VT14, OT4, OT4-1, AT3 and TS5 with improved outside surface quality (group A) and normal outside surface quality (group B) with chemical composition specified.

Tubes shall be delivered in heat treated condition.

Mechanical properties of the tube metal are given in Table 3.

Table 3

Alloy grade	Tensile strength, kg/sq.cm	Yield limit, kg/sq.cm	Elongation, %	Reduction in area, %	Impract strength, kg/sq.cm
BT1-0	35-58	25	20	42	8.0
ΠT-7M	48-70	38	18	36	8.0
ΠT-3B	57-88	53	10	30	6.5
OT4-1	60-75	50	12	35	4.5
OT4	71-90	65	10	30	3.5
BT14	90-110	80	8	25	4.0

Tubes may be delivered without heat treatment on customer's request; in this case mechanical properties are subject to agreement.

Tubes group A shall be delivered with machined inside and outside surfaces with the depth of peeling not less than 1 mm.

Tube surface roughness shall be 40 micrometers to GOST 2789-73.

Tubes group B shall be delivered in as-rolled condition.

On request tubes undergo hydraulic test at maximum pressure 400kg/sq.cm.

Tubes group A of alloys VT1-0 and PT7-M shall undergo cold flattening with distance H between the plates being calculated from the formula:

$$H = \frac{(a + 1)t}{a + t/OD},$$

where t is the specified wall thickness,

a is the rigidity ratio, equal to 0.05,

OD is the outside diameter of the specimen (mm).