

SEAMLESS HOT-FINISHED BOILER TUBES OF HEAT-RESISTANT STEEL

Material	:	acc. to St. 35.8 I	
Delivery Conditions	:	acc. to Din 17175 Class I	
Tolerances	:	acc. to Din 2448 and Din 17175-79, average wall thickness	
Test Certificate	:	acc. to EN 10204	
Dimension	:	21.3 x 2.6 mm	139.7 x 9.5 mm

SEAMLESS COLD-DRAWN STEEL HEAT-EXCHANGER AND CONDENSER TUBES

Material	:	acc. to ASTM A 179 / ASME SA 179	
		acc. to ASTM A 213-T5, T11, T12	
Delivery Conditions	:	acc. to ASTM A 179 / A 450 and ASME SA 179 / A 450	
		acc. to ASTM A 213 / A 450	
Tolerances	:	acc. to ASTM A 450 / ASME SA 450, minimum wall thickness	
Test Certificate	:	acc. to EN 10204	
Dimension	:	12.7 x 1.65 mm	38.1 x 3.4
		(1/2" x BWG 16)	(1 1/2" x BWG 10)

SEAMLESS COLD-DRAWN HYDRAULIC STEEL TUBES

Material	:	acc. to St. 37.4/52.4, normalised bright annealed	
Delivery Conditions	:	acc. to DIN 1630-84	
Tolerances	:	acc. to DIN 2391-94 Part 1	
Test Certificate	:	acc. to EN 10204	
Dimension	:	4.0 x 1.0 mm	80.0 x 10.0 mm

SEAMLESS COLD-DRAWN STAINLESS STEEL HEAT-EXCHANGER TUBES

Material	:	acc. to ASTM A 213 TP 316 L, bright annealed	
Delivery Conditions	:	acc. to ASTM A 213 A 450	
Tolerances	:	acc. to ASTM A 450, minimum wall thickness	
Test Certificate	:	acc. to EN 10204	
Dimension	:	12.7 x 0.89 mm	25.4 x 2.77 mm
		(1/2" x BWG 20)	(1" x BWG 12)

Carbon Steel Boiler And Heat Exchanger Tubes

ASTM A 178-1990a

ASTM A 214-1990a

unit : kg/m

Wall Thickness	1.2 mm	1.6 mm	2.0 mm	2.3 mm	2.6 mm	2.9 mm	3.2 mm	3.5 mm	4.0 mm	4.5 mm	5.0 mm	5.5 mm	6.0 mm	6.5 mm	7.0 mm	8.0 mm	9.5 mm	11.0 mm	12.5 mm	
Outside Diameter mm																				
15.9	0.435	0.564	0.686	0.771	0.853	0.930														
19.0	0.527	0.687	0.838	0.947	1.05	1.15														
21.7	0.607	0.793	0.972	1.10	1.22	1.34	1.46													
25.4	0.716	0.939	1.15	1.31	1.46	1.61	1.75	1.89												
27.2	0.769	1.01	1.24	1.41	1.58	1.74	1.89	2.05	2.29											
31.8	0.906	1.19	1.47	1.67	1.87	2.07	2.26	2.44	2.74	3.03										
34.0		1.28	1.58	1.80	2.01	2.22	2.43	2.63	2.96	3.27	3.58									
38.1		1.44	1.78	2.03	2.28	2.52	2.75	2.99	3.36	3.73	4.08	4.42								
42.7			2.01	2.29	2.57	2.85	3.12	3.38	3.82	4.24	4.65	5.05	5.43							
45.0			2.12	2.42	2.72	3.01	3.30	3.58	4.04	4.49	4.93	5.36	5.77	6.17						
48.6			2.30	2.63	2.95	3.27	3.58	3.89	4.40	4.89	5.38	5.85	6.30	6.75	7.18					
50.8			2.41	2.75	3.09	3.43	3.76	4.08	4.62	5.14	5.65	6.14	6.63	7.10	7.56	8.44	9.68	10.8	11.8	
54.0			2.56	2.93	3.30	3.65	4.01	4.36	4.93	5.49	6.04	6.58	7.10	7.61	8.11	9.07	10.4	11.7	12.8	
57.1			2.72	3.11	3.49	3.88	4.25	4.63	5.24	5.84	6.42	7.00	7.56	8.11	8.65	9.69	11.2	12.5	13.7	
60.3			2.88	3.29	3.70	4.10	4.51	4.90	5.55	6.19	6.82	7.43	8.03	8.62	9.20	10.3	11.9	13.4	14	
63.5				3.47	3.90	4.33	4.76	5.18	5.87	6.55	7.21	7.87	8.51	9.14	9.75	10.9	12.7	14.2	15.7	
65.0				3.56	4.00	4.44	4.88	5.31	6.02	6.71	7.40	8.07	8.73	9.38	10.0	11.2	13.0	14.6	16.2	
70.0				3.84	4.32	4.80	5.27	5.74	6.51	7.27	8.01	8.75	9.47	10.2	10.9	12.2	14.2	16.0	17.7	
76.2				4.19	4.72	5.24	5.76	6.27	7.12	7.96	8.78	9.59	10.4	11.2	11.9	13.5	15.6	17.7	19.6	
82.6							6.27	6.83	7.75	8.67	9.57	10.5	11.3	12.2	13.1	14.7	17.1	19.4	21.6	
88.9							6.76	7.37	8.37	9.37	10.3	11.3	12.3	13.2	14.1	16.0	18.6	21.1	23.6	
101.6								8.47	9.63	10.8	11.9	13.0	14.1	15.2	16.3	18.5	21.6	24.6	27.5	
114.3									10.9	12.2	13.5	14.8	16.0	17.3	18.5	21.0	24.6	28.0	31.4	
127.0									12.1	13.6	15.0	16.5	17.9	19.3	20.7	23.5	27.5	31.5	35.3	
139.8												18.2	19.8	21.4	22.9	26.0	30.5	34.9	39.2	

COMPARISON OF INTERNATIONAL SPECIFICATIONS & GRADES

Specifications - DIN-Standards & Other Comparative International Standards For Seamless & Welded Pressure Vessel Tubes

Steel grade DIN mat. No.	DIN standard	Quality class	Operating temperature	Field of application	Steel / Grade	ASTM ASME Standard/Grade					
St.37.0 1.0254	TS 360*	DIN1629 ISO 9329*	Special requirements	≤300°C	Heat exchangers, pressure vessels and line pipes	St. 37.0	A/SA 53 Gr.A				
St. 44.0 1.0256	TS 410* TS 430*					St. 44.0	A/SA 53 Gr.B				
St. 52.0 1.0421	TS 500*					St. 52.0					
St. 37.4 1.0255	DIN 1630	Particularly high demands	≤300°C	Heat exchangers, pressure vessels and line pipes as well as in gen. mech. engineering & equipment construction for particularly high demands		St. 37.4					
St. 44.4 1.0257						St. 44.4					
St. 52.4 1.0581						St. 52.4					
St. 35.8 1.0305	DIN17175	Quality grade 1	≤450°C	Steam boilers, pipes pressure vessels & heat exchangers		St. 35.8	A/SA 106 } Gr.A A/SA 179 } Carbon A/SA 192 } Steel A/SA 556 } Gr.A2				
St.45.8 1.0405						St 45.8	A/SA 106 } Gr.B A/SA 210 } Gr.A1 A/SA 556 } Gr.B2				
17 Mn 4 1.0481						17 Mn 4	A/SA 106 } Gr.C A/SA 210 } Gr. C A/SA 556 } Gr.C 2				
19 Mn 5 1.0482						19 Mn 5					
St 35.8 1.0305						DIN17175	Quality grade III	≤480°C		St. 35.8	
St 45.8 1.0405										St.45.8	
17 Mn 4 1.0481			≤500°C		17 Mn 4						
19 Mn 5 1.0482					19 Mn 5						
15 Mo 3 1.5415			≤530°C		15 Mo 3						
13 Cr Mo 4 4 1.7335			≤560°C		13 Cr Mo 44	A/SA 199 } T 11 A/SA 200 } T 12 A/SA 213 } A/SA 335 } P 11, P 12**					
10 Cr Mo 9 10 1.7380			≤590°C		10 Cr Mo 9 10	A/SA 199 } T 22 A/SA 200 } A/SA 213 } A/SA 335 } P 22					
14 Mo V 63 1.7715			≤560°C		14 Mo V 63						
X 20 Cr Mo V 12.1 1.4922			≤650°C								

CARBON STEEL BOILER & HEAT EXCHANGER TUBES

☐ : Carbon Grades
 ☐ : High Temperature Grades

B S Standard/Grade	B V 23-35/77	N F Standard/Grade	GOST Standard/Grade	DNV X § 7	LR S Teil 2: Kap. 6: Abschn. 2	UNI Standard/Grade	JIS Standard/Grade
3059Pt.1 Steel 320 3601 320 360 360 6323 HFS 3 CFS 3		A49-112 TU E 220 4 A49-210,-310, -310,-321 8733 -330 TU 37 b	8731 10 10	NVR 1-1	320	663 Fe 35-1 6363 Fe 35	G 3454 STPG 38 G 3455 STS 38
3601 Steel 430 6323 HFS 4 CFS 4		A 49-501 TU E 275-2 275-3 A49-112 TU E 235 A	8731 20 8732 20			663 45-1 6363 Fe 42	G 3454 STPG 42 G 3455 STS 42
6323 Steel HFS 5 CFS 5		A49-310,-311, -312,-321 TU 52 b -330	5058 18 G 2			663 } Fe 52-2 6363 }	
		A 49-321 TU 52 BT		NVR 1-4	490		
3059 Pt.2 } Steel 360 Cat. 2 3602 Pt.1 }	320, 360	A 49-215 TU 37 b A 49-219 TU 37 F	550 10		360	663 Fe 35-2 5462 C14	G3461 ST B 340
3602 Pt.1 Steel 430 Cat. 2	410	A 49-215 TU 42 b A 49-219 TU 42 F			410	663 Fe 45-2 5462 C18	G3461 ST B 410
3059 Pt.2 Steel 440 Cat. 2 3606 Steel 440 Cat. 2	460				460		
3059 Pt.2 } Steel 360 Cat. 1 3602 Pt.1 }		A 49-213 TU 37 C					
3602 Pt.1 Steel 430 Cat. 1		A 49-213 TU 42 C	TU 14-3-460 20				
3059 Pt.2 Steel 440 Cat. 1 3606 Steel 440 Cat. 1		A 49-213 TU 48 C					
3059 Pt.2 } Steel 243 3606 }	0,3 Mo	A49-213 } TU 15 D3 -215 } -219 }		NVR 7-1			
3059 Pt.2 } 3604 } 3606 }	1 Cr Steel 620-460 0,5 Mo	A 49-213 } TU 13 CD 4 04 -215 } TU 10 CD 5 05 -219 }	TU 14-3-460 15 Ch M	NVR 7-2	1 Cr 1/2 Mo	5462 14 Cr Mo 3	G 3458 ST PA 22,23 G 3462 ST BA 22,23
3059 Pt.2 } 3604 } 3606 }	2,25 Cr Steel 622-490 1 Mo	A 49-213 } TU 10 CD 9 10 -215 } -219 }		NVR 7-3	2 1/4 Cr 1 Mo	5462 12 Cr Mo 9 10	G 3458 ST PA 24 G 3462 ST BA 24
3606 Steel 660					1/2 Cr 1/2 Mo 1/2 V		
3059 Pt. 2 Steel 762							

COMPARISON OF INTERNATIONAL SPECIFICATIONS & GRADES

Steel grade DIN mat. No.	DIN standard	Quality class	Operating temperature	Field of application	Steel / Grade	ASTM ASME Standard/Grade
X 10 Cr Mo VNb9.1	Based on DIN17175	Quality grade III	≤650°C	Steam boilers, pipes pressure vessels & heat exchangers		A/SA 199 } A/SA 200 } T91 A/SA 213 } A/SA 335 } P91
8 Mo B 5-4			≤530°C			
16 Mo 5 1.5423			≤530°C		16 Mo 5	A/SA 161 } T1 A/SA 209 } A/SA 335 } P1
12 Cr 1 Mo V			≤600°C		12 Cr 1 Mo V	
25 Cr Mo 4 1.7218	DIN17176	Quality grade III	≤550°C		25 Cr Mo 4	
13 Cr Mo 4 4 1.7335			≤570°C		13 Cr Mo 4 4	A/SA 199 } T11, T12 A/SA 200 } A/SA 213 }
10 Cr Mo 9 10 1.7380			≤600°C		10 Cr Mo 9 10	A/SA 199 } T22 A/SA 200 } A/SA 213 } A/SA 335 } P22
12 Cr Mo 9 10 1.7375			≤520°C		12 Cr Mo 9 10	
12 Cr Mo 12 10 1.7381			≤520°C		12 Cr Mo 12 10	A/SA 199 } T21 A/SA 200 } A/SA 213 } A/SA 335 } P21
12 Cr Mo 19 5 1.7362			≤650°C		12 Cr Mo 19 5	A/SA 199 } T5 A/SA 200 } A/SA 213 } A/SA 335 } P5
X 12 Cr Mo 9.1 1.7386			≤650°C			A/SA 199 } T9 A/SA 200 } A/SA 213 } A/SA 335 } P9

CARBON STEEL BOILER & HEAT EXCHANGER TUBES

B S Standard/ Grade	B V 23-35/77	N F Standard/ Grade	GOST Standard/ Grade	DNV x 7	L R S Teil 2:	UNI Standard/Grade	J I S Standard/Grade
		A 49-213 } Z 10 CD Nb V 09-01					
3606 Steel 261							
3606 Steel 245						5462 16 Mo 5	G 3458 ST PA 12 G 3462 ST BA 12
			TU 14-3-460 12Ch1MF				
3059 Pt. 2 } 3604 } Steel 620-460 3606 }	1Cr 0,5 Mo	A 49-213 } TU 13 CD 4 04 -215 } TU 10 CD 5 05 -219 }	TU 14-3-460 15ChM	NVR 7-Z	1Cr 1/2 Mo	5462 14 CR Mo 3	G 3458 ST PA 22,23 G 3462 ST BA 22,23
3059 Pt. 2 } 3604 } Steel 622-490 3606 }	12,25 Cr 1 Mo	A 49-213 } -215 } TU 10 CD 9 10 -219 }					G 3458 ST PA 24 G 3462 ST BA 24
3604 } 3606 }	Steel 625	A 49-213 } TU Z 10 CD 5 05 - } bzw. -219 } TU Z 12 CD 5 05	550 } 5632 }	15Ch5M			G 3458 St PA 25 G 3462 ST BA 25
3604	Steel 629	A 49-213 Z 10 CD 9					

