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**SEAMLESS TUBES FOR BOILER****&****HIGH TEMPERATURE SERVICE****1. Standards**

DIN 17175, EN 10216-2, ASTM A 106, NF A 49 -211 , ASTM A179/A179M

2. Used for

Construction for : boiler, pipe lines, pressure vessels, equipment for high temperature and pressure.

3. Dimensions

-Cold finished – acc. Tab.1

-Hot finished – ASSEL mill acc. Tab.2.1

-Hot finished – CPE mill acc. Tab.2.2

Tab.1 COLD ROLLED MECHANICAL TUBES acc. DIN 2448 or EN 10216-2

WT	mm	2	2.3	2.6	2.9	3.2	3.6	4	4.5	5	5.6	6.3	7.1	8	8.8	10	11	12.5
	in	0.079	0.091	0.102	0.114	0.126	0.142	0.157	0.177	0.197	0.220	0.248	0.280	0.315	0.346	0.394	0.433	0.492
OD	Max Length (m)																	
mm	in																	
20	0.787	10	10	10	10	10	10	10	10	10								
21.3	0.839	10	10	10	10	10	10	10	10	10								
25	0.984	10	10	10	10	10	10	10	10	10	10	10						
25.4	1.000	10	10	10	10	10	10	10	10	10	10	10						
26.9	1.059		10	10	10	10	10	10	10	10	10	10	10					
30	1.181			12	12	12	12	12	12	12	12	12	12	12				
31.8	1.252			12	12	12	12	12	12	12	12	12	12	12				
33.7	1.327			12	12	12	12	12	12	12	12	12	12	12				
38	1.496				12	12	12	12	12	12	12	12	12	12	12	12		
42.4	1.669					12	12	12	12	12	12	12	12	12	12	12	12	
44.5	1.752					12	12	12	12	12	12	12	12	12	12	12	12	
48.3	1.902					12	12	12	12	12	12	12	12	12	12	12	12	
51	2.008					11	11	11	11	11	11	11	11	11	11	11		
54	2.126					10	10	10	10	10	10	10	10	10	10	10	10	10
57	2.244							9	9	9	9	9	9	9	9	9	9	9
60.3	2.374							9	9	9	9	9	9	9	9	9	9	9
63.5	2.500								9	9	9	9	9	9	9	9	9	9
70	2.756								9	9	9	9	9	9	9	9	9	9
73	2.874										9	9	9	9	9	9	9	9
76.1	2.996										9	9	9	9	9	9	9	9
82.5	3.248										9	9	9	9	9	9	9	9
88.9	3.500											9	9	9	9	9	9	9
95	3.740												9	9	9	9	9	9
101.6	4.000												9	9	9	9	9	9
108	4.252												9	9	9	9	9	9

Notes:

1. Intermediate sizes can be produced subject to agreement before ordering.

2. Weight $We=10.68 (OD-WT) \times WT$, [lbs/ft]

$We=0.0246615 \times (OD-WT) \times WT$, [kg/m];

3. Cold mechanicals acc. DIN 1629, DIN 1630, do not cover surface and precision size request for DIN 2391.

For these tubes please consult Precision Programm.

4. For seamless cold-drawn low-carbon Steel heat-exchanger and condenser, acc. ASTM A179/A179M, tubes outside diameter and wall thickness will be stipulate in costumer order, in diemeter range $17 \div 76.2\text{mm}$ (0.669÷3 in) and maximum length: 18m (59ft).



Tab. 2.1 HOT ROLLED MECHANICAL TUBES acc. DIN 2448 or EN 10216-2 - ASSEL MILL

WT	mm	6.3	7.1	8.0	8.8	10.0	11.0	12.5	14.2	16.0	17.5	20.0	22.2	25.0	28.0	30.0	32.0	35.0	36.0	40.0	45.0	50.0	55.0	60
	in	0.248	0.280	0.315	0.346	0.394	0.433	0.492	0.559	0.630	0.689	0.787	0.874	0.984	1.102	1.181	1.260	1.378	1.417	1.575	1.772	1.969	2.165	2.362
Max Length [m]																								
OD																								
mm	in																							
70.0	2.756						12.0	11.0	11.0	11.0	10.0	10.0												
73.0	2.874						10.5	10.5	10.5	10.5	10.0	10.0												
76.1	2.996						11.0	10.5	10.5	10.0	10.0	10.0												
82.5	3.248						11.0	10.5	10.5	10.0	9.5	9.5	9.0	8.0										
88.9	3.500							10.0	10.0	9.0	9.0	9.0	9.0	8.0										
95.0	3.740							10.0	10.0	10.0	10.0	9.0	8.5	8.0										
101.6	4.000							9.0	9.0	8.5	8.0	8.0	8.0	8.0										
108.0	4.252							9.0	9.0	9.0	8.5	8.5	8.0	8.0	8.0	7.0								
114.3	4.500							10.0	10.0	8.0	8.5	7.5	7.0	7.0	6.5	6.5	6.5							
121.0	4.764	12.5	12.5	12.0	12.0	11.0	11.0	10.0	9.5	9.5	8.5	7.5	7.5	7.0	7.0	6.5	6.0	6.0	6.0					
127.0	5.000	12.5	12.5	12.0	12.0	11.0	11.0	10.0	9.5	9.0	8.5	8.0	8.0	7.5	7.5	7.0	7.0	7.0	7.0					
133.0	5.236	12.5	12.5	12.0	12.0	11.0	10.0	10.0	9.5	9.0	8.5	8.0	8.0	7.5	7.0	7.0	7.0	7.0	7.0					
139.7	5.500	12.5	12.5	12.0	12.0	11.0	11.0	10.0	9.5	9.0	8.5	8.0	8.0	7.5	7.0	7.0	7.0	6.5	6.5	6.0				
146.0	5.748	12.0	12.0	12.0	12.0	11.0	11.0	9.0	9.0	9.0	8.5	8.0	8.0	8.0	7.5	7.0	7.0	6.5	6.3	6.0				
152.4	6.000	12.0	12.0	12.0	12.0	11.0	11.0	9.0	9.0	9.0	8.5	8.0	8.0	8.0	7.5	7.0	7.0	7.0	7.0	6.5				
159.0	6.260	12.0	12.0	12.0	12.0	11.0	11.0	9.0	9.0	9.0	8.5	8.0	8.0	8.0	7.5	7.0	7.0	7.0	7.0	6.5	6.0			
165.1	6.500	12.5	12.5	12.0	11.5	11.0	11.0	10.0	9.0	8.5	8.5	8.0	8.0	8.0	8.0	7.5	7.0	7.0	7.0	7.0	6.5			
168.3	6.626		12.5	12.0	11.5	11.0	11.2	10.0	9.0	8.5	8.5	8.0	8.0	8.0	8.0	7.5	7.0	7.0	7.0	7.0	7.0			
177.8	7.000		12.0	12.0	11.5	11.0	10.5	10.0	9.0	8.4	8.2	8.0	8.0	8.0	7.5	7.0	7.0	7.0	7.0	6.5	6.5	6.3		
193.7	7.626			11.0	10.5	10.0	10.0	9.5	9.0	8.3	8.2	8.0	8.0	7.5	7.5	7.0	7.0	7.0	7.0	7.0	6.5	6.1	6.0	
203.0	7.992			11.0	11.0	10.5	10.5	10.5	10.0	8.5	8.5	8.5	8.5	8.0	7.5	7.0	7.0	7.0	6.5	6.5	6.0	6.0	6.0	
216.0	8.504			10.5	10.5	10.0	9.5	9.0	9.0	8.8	8.5	8.5	8.5	8.0	7.5	7.0	7.0	7.0	6.5	6.0	6.0	6.0	5.5	5.0
219.1	8.626			10.5	10.5	10.0	9.5	9.0	9.0	8.8	8.5	8.5	8.5	8.0	7.5	7.0	7.0	7.0	6.5	6.0	6.0	5.5	5.0	5.0
224.0	8.819											8.0	8.0	7.5	7.0	6.5	6.5	6.5	6.0	5.5	5.5	5.0	5.0	5.0
229.0	9.016											8.0	8.0	7.5	7.0	6.5	6.5	6.5	6.0	5.5	5.5	5.0	5.0	5.0



-category H1 (OD/WT>12.5 and Mannesmann ASSEL mill)
-category H3 (4<OD/WT<12.5 and calibrating mill)



-category H2 (reducing mill)
-category H4 (OD/WT<4 and calibrating mill)

Notes:

- Interm. sizes are available as follow:
-for OD<82,5 and OD/WT<12.5, any time
-for OD<82,5 or OD/WT>12.5, subject of
- Weight:
 $We=10.68 (OD-WT) \times WT \text{ [lbs/ft]}$
 $We=0.0246615 \times (OD-WT) \times WT \text{ [kg/m]}$

Tab.2.2 HOT ROLLED MECHANICAL TUBES acc. DIN 2448 or EN 10216-2 - CPE MILL

WT	mm	2.3	2.6	2.9	3.2	3.6	4	4.5	5	5.6	6.3	7.1	8.0	8.8	10.0	11.0
	in	0.091	0.102	0.114	0.126	0.142	0.157	0.177	0.197	0.217	0.248	0.280	0.315	0.346	0.394	0.433
OD		Max Length (m)														
mm	in															
21.3	0.839	9.0	9.0	9.0	9.0	9.0										
26.9	1.059	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0							
31.8	1.252		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0					
33.7	1.327		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0					
38.0	1.496		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0					
42.4	1.669		9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0					
48.3	1.902		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0				
51.0	2.008		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0			
54.0	2.126			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		
57.0	2.244			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		
60.3	2.374			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0		
63.5	2.500			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
70.0	2.756			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
73.0	2.874			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
76.1	2.996			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
82.5	3.248				12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
88.9	3.500				12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
95.0	3.740					12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
101.6	4.000					12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	10.0
108.0	4.252					12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	10.0
114.3	4.500					12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	10.0

HP1

- rolling R1 (OD<48.3)

HP2

- rolling R1 or R2 (OD>=48.3 and OD/WT>=10)

HP3

- rolling R2 (OD>=48.3 and OD/WT<10)

Note:

Weight:

$We = 10.68 (OD - WT) \times WT \text{ [lbs/ft]}$

$We = 0.0246615 (OD - WT) \times WT \text{ [kg/m]}$

4. Tolerances

Standard	Outside Diameter	Wall Thickness	Weight
ASTM A 106 NF A 49-211	OD≤48.3 ±0.40mm 48.3<OD≤114.3 ±0.79mm 114.3<OD≤219.1 +1.59/-079mm	+12.5%	+10/-3.5% for any length of pipe
DIN 17175 hot rolled	OD≤100 ±0.75% OD>100 ±0.90%	WT≤2Sn +15/-10% 2Sn<WT≤4Sn +12.5/-10% 4Sn<WT ±9%	+10/-8% for each tube ±7.5% for a lots over 10t
DIN 17175 cold rolled	±0.6% or ±0.25 mm, whichever is the greater	±10%	+10/-8% for each tube ±7.5% for a lots over 10t
EN 10216-2 hot rolled	±1% or ±0.5mm, whichever is the greater	+28%/0 or +0.8/0mm, Whichever is the greater	
EN 10216-2 cold rolled	±0.5% or ±0.3 mm, whichever is the greater	±10% or ±0.2mm, Whichever is the greater	

5. Chemical Composition (%)

Steel Group	C	Si	Mn	P max	S max
Grade A, TU E275	max 0.25	min 0.10	0.27÷0.93	0.035	0.035
Grade B	max 0.30	min 0.10	0.29÷1.06	0.035	0.035
St35.8, TU E220	max 0.17	0.10÷0.35	0.40÷0.80	0.040	0.040
St45.8, TU E250	max 0.21	0.10÷0.35	0.40÷1.20	0.040	0.040
P195GH	max.0.13	max.0.35	max.0.70	0.025	0.020
P235GH	max.0.16	max.0.35	max.1.20	0.025	0.020
P265GH	max.0.20	max0.40	max.1.40	0.025	0.020

6. Mechanical Properties

Steel Group	Yield Strength, min.	Tensile Strength	Elongation	Impact	
	N/mm ²			Min(J)	(°C)
Grade A, TU E275	205	330	Calculation acc. to the wall thickness		
Grade B	240	415			
St35.8, TU E220	235	360÷480	25		
St45.8, TU E250	255	410÷530	21		
P195GH	195	320÷440	27	40	0
P235GH	225	360÷500	25	40	0
P265GH	255	410÷570	23	40	0

7. Lengths

- random lengths: 5÷12m(16.4÷39.8 ft);
- fixed lengths within the random lengths range;
- tubes under 5m (16.4 ft) will be delivered as multiple lengths;
- tolerances: +100/-0mm (+3.94/-0 in).

8. Protection

- unprotected;
- external varnished with black or clear lacquer;
- if required, the tubes can be delivered with plastic caps at both ends.

9. Marking

According to standard or per customer request.

10. Delivery

Bundles up to: -2000 kg (4400 lbs) - cold drawn tubes;
-4000 kg (8800 lbs) - hot rolled tubes.

11. Mill test report

Mill test reports are issued to customer requirements. Usually they comply with EN 10204 , type 3.1.

12. Quality certified:

TUV; PED; DNV; GL