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Translation
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Copper Wrought Alloy Tubes
Seamless Drawn
Preferred Dimensions for Pipelines

DIN
1755
Sheet 3

Rohre aus Kupfer-Knetlegierungen, nahtlosgezogen;
Vorzugsmaße für Rohrleitungen

Dimensions in mm

1. Scope

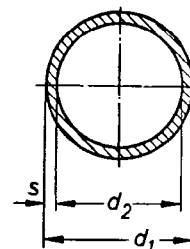
On the basis of the provisions in DIN 1755 Sheet 1, this Standard applies for preferred dimensions of seamless tubes to coordination of tolerance A *) of outside diameter from 3 to 419 mm and wall thickness from 0.5 to 6 mm to be used for pipelines of nominal width 2 to 400 and for which internationally standardized joints (flanges and unions) and fittings are available.

Tubes to this Standard are preferentially manufactured from the materials of material groups II and III quoted in Section 4.

2. Designation

Designation of a seamless tube of outside diameter $d_1 = 20$ mm and wall thickness $s = 2$ mm in the material with the symbol CuZn20Al (formerly SoMs76) or the material number 2.0460:

Tube 20 × 2 DIN 1755 - CuZn20Al F35
or Tube 20 × 2 DIN 1755 - 2.0460.10



3. Dimensions and permissible variations

3.1. Outside diameter and wall thickness

The permissible variations on outside diameter and wall thickness are given in Tables 1 to 8 as shown in the schedule (see Page 2).

For tubes in the soft condition of the material concerned, designated by the appended number .10 after the material number (see DIN 17671 Sheet 1) only the permissible variations for the mean diameter ($d_{1\text{mean}}$) given in Tables 1 to 8 apply, since the permissible variations on the diameter including out-of-roundness ($d_{1\text{tot}}$) cannot be guaranteed for these tubes.

*) See "Coordination of tolerances for cross-section dimensions of non-ferrous metal tubes", DIN-Mitt. Vol.45 (1966) No. 11, pp. 597-603.

Obtainable as special publication D-346 from Beuth-Vertrieb GmbH, Berlin 30 and Köln.

Continued on pages 2 to 7
Explanations on page 8

Schedule showing the distribution of the permissible variations on outside diameter and wall thickness corresponding to material groups II and III in Tables 1 to 8

Outside diameter d_1	Wall thickness s											Outside diameter d_1
	0,5	0,75	1	1,5	2	2,5	3	3,5	4	5	6	
3												3
4												4
5												5
6												6
8												8
10												10
12	Material group II see Table 1 page 3					Material group II see Table 2 page 3						12
14												14
15												15
16												16
18	Material group III see Table 5 page 5					Material group III see Table 6 page 5						18
20												20
22												22
25												25
28												28
30												30
35												35
38												38
42					Material group II see Table 3 page 4							42
44,5												44,5
57												57
76												76
89					Material group III see Table 7 page 6							89
108												108
114												114
133												133
159									159			
168									168			
194									194			
219												
267	267											
273	Material group III see Table 8 page 6				273							
324					324							
368					368							
419									419			
	Wall thickness s											
	0,5	0,75	1	1,5	2	2,5	3	3,5	4	5	6	

This document contains colours that are necessary for its correct interpretation.

Table 1. Material Group II

Outside diameter d_1	Perm. + var. for d_{1mean}		Perm. + var. for U		Min. wall thickness		Perm. + var. for U		Weight		Min. wall thickness		Perm. + var. for U		Weight		Min. wall thickness		Out- side diam- eter d_1	Corre- spond- ing nominal width
	d_{1mean}	δ_{mean}	U	δ_{mean}	kg/m	kg/m	kg/m	U	kg/m	kg/m	kg/m	kg/m	U	kg/m	kg/m	kg/m	kg/m	kg/m		
3	0.07	0.05	0.03	0.03	0.03	0.08	0.05	0.04	0.09	0.06	0.88	0.09	0.06	0.09	0.06	0.88	0.09	0.06	3	2
4	0.07	0.05	0.03	0.03	0.03	0.08	0.07	0.04	0.09	0.08	0.88	0.09	0.06	0.09	0.06	0.88	0.09	0.06	4	3
5	0.07	0.05	0.03	0.03	0.03	0.08	0.09	0.04	0.09	0.11	0.88	0.09	0.06	0.09	0.06	0.88	0.09	0.06	5	4
6	0.07	0.05	0.03	0.03	0.03	0.08	0.11	0.04	0.09	0.14	0.88	0.09	0.06	0.09	0.06	0.88	0.09	0.06	6	5
8	0.09	0.06	0.03	0.03	0.03	0.08	0.15	0.04	0.09	0.20	0.87	0.09	0.06	0.09	0.06	0.87	0.09	0.06	8	6
10	0.09	0.06	0.03	0.03	0.03	0.08	0.13	0.04	0.09	0.25	0.87	0.09	0.06	0.09	0.06	0.87	0.09	0.06	10	8
12	0.12	0.08	0.03	0.03	0.03	0.08	0.24	0.04	0.09	0.31	0.87	0.09	0.06	0.09	0.06	0.87	0.09	0.06	12	10
14	0.12	0.08	0.03	0.03	0.03	0.08	0.28	0.04	0.09	0.36	0.87	0.09	0.06	0.09	0.06	0.87	0.09	0.06	14	12
15	0.12	0.08	0.04	0.04	0.04	0.08	0.30	0.04	0.09	0.39	0.86	0.09	0.06	0.09	0.06	0.86	0.09	0.06	15	12
16	0.12	0.08	0.04	0.04	0.04	0.08	0.32	0.04	0.09	0.42	0.86	0.09	0.06	0.09	0.06	0.86	0.09	0.06	16	12
18	0.12	0.08	0.04	0.04	0.04	0.08	0.36	0.04	0.09	0.48	0.86	0.09	0.06	0.09	0.06	0.86	0.09	0.06	18	16
20	0.18	0.12	0.05	0.05	0.05	0.08	0.40	0.05	0.09	0.53	0.85	0.09	0.06	0.09	0.06	0.85	0.09	0.06	20	16
22	0.18	0.12	0.05	0.05	0.05	0.08	0.40	0.05	0.09	0.59	0.85	0.09	0.06	0.09	0.06	0.85	0.09	0.06	22	20
25	0.18	0.12	0.05	0.05	0.05	0.08	0.40	0.05	0.09	0.67	0.85	0.09	0.06	0.09	0.06	0.85	0.09	0.06	25	20
28	0.18	0.12	0.05	0.05	0.05	0.08	0.40	0.05	0.09	0.75	0.85	0.09	0.06	0.09	0.06	0.85	0.09	0.06	28	25
30	0.18	0.12	0.05	0.05	0.05	0.08	0.40	0.05	0.09	0.81	0.85	0.09	0.06	0.09	0.06	0.85	0.09	0.06	30	25
35	0.24	0.15	0.06	0.06	0.06	0.10	0.95	0.08	0.10	1.40	0.84	0.10	0.08	0.10	0.08	0.84	0.10	0.08	35	32
38	0.24	0.15	0.06	0.06	0.06	0.10	1.03	0.08	0.10	1.53	0.84	0.10	0.08	0.10	0.08	0.84	0.10	0.08	38	32

Table 2. Material Group II

Outside diameter d_1	Perm. + var. for d_{1mean}		Perm. + var. for U		Min. wall thickness		Perm. + var. for U		Weight		Min. wall thickness		Perm. + var. for U		Weight		Min. wall thickness		Out- side diam- eter d_1	Corre- spond- ing nominal width	
	d_{1mean}	δ_{mean}	U	δ_{mean}	kg/m	kg/m	kg/m	U	kg/m	kg/m	kg/m	kg/m	U	kg/m	kg/m	kg/m	kg/m	kg/m			kg/m
10	0.09	0.06	0.04	0.04	0.23	0.52	2.23	0.05	0.24	0.59	2.71	0.08	0.27	0.83	3.15	0.08	0.32	0.89	3.60	10	8
12	0.12	0.08	0.05	0.05	0.23	0.66	2.22	0.06	0.24	0.75	2.70	0.08	0.27	1.03	3.15	0.08	0.32	1.12	3.60	12	10
14	0.12	0.08	0.05	0.05	0.23	0.80	2.22	0.06	0.24	0.92	2.70	0.08	0.27	1.13	3.14	0.09	0.32	1.23	3.59	14	14
15	0.12	0.08	0.07	0.07	0.23	0.87	2.20	0.08	0.24	1.01	2.68	0.09	0.27	1.22	3.14	0.09	0.32	1.34	3.59	15	15
16	0.12	0.08	0.07	0.07	0.23	0.94	2.20	0.08	0.24	1.09	2.68	0.09	0.27	1.22	3.14	0.09	0.32	1.34	3.59	16	16
18	0.12	0.08	0.07	0.07	0.23	1.26	2.68	0.08	0.24	1.26	2.68	0.08	0.24	1.26	2.68	0.08	0.24	1.26	2.68	18	16
20	0.16	0.12	0.08	0.08	0.23	1.57	2.19	0.10	0.27	1.43	2.63	0.10	0.27	1.43	2.63	0.10	0.27	1.43	2.63	20	20
22	0.16	0.12	0.08	0.08	0.23	1.78	2.19	0.10	0.27	1.59	2.63	0.10	0.27	1.59	2.63	0.10	0.27	1.59	2.63	22	20
25	0.18	0.12	0.08	0.08	0.23	1.92	2.17	0.10	0.27	1.78	2.63	0.10	0.27	1.78	2.63	0.10	0.27	1.78	2.63	25	25
28	0.18	0.12	0.08	0.08	0.23	2.27	2.17	0.10	0.27	2.06	2.61	0.10	0.27	2.06	2.61	0.10	0.27	2.06	2.61	28	30
30	0.24	0.15	0.10	0.10	0.23	2.48	2.17	0.12	0.27	2.24	2.61	0.12	0.27	2.24	2.61	0.12	0.27	2.24	2.61	30	30
35	0.24	0.15	0.10	0.10	0.23	2.48	2.17	0.12	0.27	2.94	2.61	0.12	0.27	2.94	2.61	0.12	0.27	2.94	2.61	35	32

Footnotes 1) to 6) see page 6, for key to colour coding see page 4

This document contains colours that are necessary for its correct interpretation.

Table 3. Material group II

Outside diameter d_1	Wall thickness s												Outside diameter d_1				
	1.5			2			2.5			3				3.5			
	Perm. + var. for d_1 mean	Perm. + var. for U	Weight kg/m	Min. wall thickness	Perm. + var. for mean	Perm. + var. for U	Weight kg/m	Min. wall thickness	Perm. + var. for mean	Perm. + var. for U	Weight kg/m	Min. wall thickness		Perm. + var. for mean	Perm. + var. for U	Weight kg/m	Min. wall thickness
42	0.24	0.15	0.08	0.15	1.70	1.27	1.72	2.24	0.10	0.23	2.76	2.17	0.12	0.27	3.27	2.61	42
44.5	0.24	0.15	0.08	0.15	1.80	1.27	2.38	2.84	0.10	0.23	2.94	2.17	0.12	0.27	3.48	2.61	44.5
57	0.30	0.20	0.10	0.15	2.33	1.25	3.08	3.81	0.12	0.25	5.14	2.13	0.14	0.27	4.53	2.59	57
76	0.30	0.20	—	—	—	—	4.14	4.14	0.12	0.25	5.14	2.13	0.14	0.27	6.12	2.59	76
89	0.40	0.25	—	—	—	—	4.87	4.87	0.14	0.20	6.05	2.10	0.16	0.27	7.21	2.57	89
108	0.50	0.25	—	—	—	—	—	—	0.15	0.25	7.37	2.10	0.16	0.27	8.81	2.57	108
114	0.50	0.25	—	—	—	—	—	—	0.15	0.25	7.79	2.10	0.16	0.27	9.31	2.57	114
133	1.0	0.50	—	—	—	—	—	—	0.18	0.25	9.12	2.07	0.20	0.30	10.9	2.50	133
159	1.0	0.50	—	—	—	—	—	—	0.18	0.25	10.9	2.07	0.20	0.30	13.1	2.50	159
168	1.0	0.50	—	—	—	—	—	—	0.18	0.25	11.6	2.07	0.20	0.30	13.8	2.50	168
194	n.v.	0.50	—	—	—	—	—	—	0.18	0.25	13.4	2.07	0.20	0.30	16.0	2.50	194

Table 4. Material group II

Outside diameter d_1	Wall thickness s												Outside diameter d_1					
	3			3.5			4			5				6				
	Perm. + var. for d_1 mean	Perm. + var. for U	Weight kg/m	Min. wall thickness	Perm. + var. for mean	Perm. + var. for U	Weight kg/m	Min. wall thickness	Perm. + var. for mean	Perm. + var. for U	Weight kg/m	Min. wall thickness		Perm. + var. for mean	Perm. + var. for U	Weight kg/m	Min. wall thickness	
219	0.75	0.24	0.36	1.81	2.40	0.26	0.42	21.1	2.82	0.26	0.48	24.0	3.26	0.28	0.60	29.9	4.12	219
267	n.v.	0.75	0.24	0.36	2.21	2.40	0.26	0.42	25.8	2.82	0.26	0.48	29.4	0.28	0.60	36.6	4.12	267
273	n.v.	0.75	0.24	0.36	22.6	2.40	0.26	0.42	26.4	2.82	0.26	0.48	30.1	0.28	0.60	37.4	4.12	273
324	n.v.	1.0	—	—	—	—	—	—	—	—	0.32	0.60	35.8	0.35	0.75	44.4	3.90	324
368	n.v.	1.0	—	—	—	—	—	—	—	—	0.32	0.60	40.7	0.35	0.75	50.8	3.90	368
419	n.v.	1.0	—	—	—	—	—	—	—	—	0.32	0.60	46.4	0.35	0.75	57.9	3.90	419

Footnotes 1) to 6) see page 6

Key to colour coding of the ratios $d_1 : s$ in Tables 1 to 8:

no colour

$d_1 : s$ to 30

full surface

$d_1 : s$ above 30 to 50

with screen

$d_1 : s$ above 50

This document contains colours that are necessary for its correct interpretation.

Table 5. Material group III

Outside diameter		Wall thickness s										Outside diameter						
d ₁	d _{1 tot}	0.5		0.75		1		1.5		2		Corresponding nominal width						
		Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness							
8	0.15	0.10	0.05	0.10	0.40	0.05	0.08	0.15	0.62	0.05	0.10	0.20	0.85	0.07	0.18	0.34	1.75	8
10	0.15	0.10	0.05	0.13	0.40	0.05	0.08	0.19	0.62	0.05	0.10	0.25	0.85	0.07	0.18	0.45	1.75	10
12	0.20	0.15	0.05	0.14	0.40	0.05	0.08	0.24	0.62	0.05	0.10	0.31	0.85	0.09	0.18	0.56	1.73	12
14	0.20	0.15	0.05	0.19	0.40	0.05	0.08	0.28	0.62	0.05	0.10	0.36	0.85	0.07	0.18	0.67	1.73	14
15	0.20	0.15	0.07	0.20	0.38	0.07	0.08	0.30	0.60	0.07	0.10	0.39	0.83	0.07	0.18	0.73	1.71	15
16	0.20	0.15	—	—	—	0.07	0.08	0.32	0.60	0.07	0.10	0.42	0.83	0.07	0.18	0.78	1.71	16
18	0.20	0.15	—	—	—	0.07	0.08	0.36	0.60	0.07	0.10	0.48	0.83	0.07	0.18	0.89	1.71	18
20	0.30	0.20	—	—	—	0.09	0.08	0.40	0.58	0.09	0.10	0.53	0.81	0.11	0.18	1.01	1.68	20
22	0.30	0.20	—	—	—	—	—	—	—	0.09	0.10	0.59	0.81	0.11	0.18	1.12	1.68	22
25	0.30	0.20	—	—	—	—	—	—	—	0.09	0.10	0.67	0.81	0.11	0.18	1.29	1.68	25
28	0.30	0.20	—	—	—	—	—	—	—	0.09	0.10	0.75	0.81	0.11	0.18	1.45	1.68	28
30	0.30	0.20	—	—	—	—	—	—	—	0.09	0.10	0.81	0.81	0.11	0.18	1.57	1.68	30
35	0.38	0.25	—	—	—	—	—	—	—	0.11	0.10	0.95	0.79	0.14	0.18	1.85	1.64	35
38	0.38	0.25	—	—	—	—	—	—	—	0.11	0.10	1.03	0.79	0.14	0.18	2.01	1.64	38

Table 6. Material group III

Outside diameter		Wall thickness s										Outside diameter						
d ₁	d _{1 tot}	2.5		3		3.5		4		5		Corresponding nominal width						
		Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness	Perm. + var. for mean	Min. wall thickness							
10	0.15	0.10	0.07	0.23	0.52	0.09	0.24	0.59	2.67	—	—	—	—	—	—	—	—	10
12	0.20	0.15	0.09	0.23	0.66	0.11	0.24	0.75	2.65	0.14	0.27	0.83	3.09	0.14	0.32	0.89	3.54	12
14	0.20	0.15	0.09	0.23	0.80	0.11	0.24	0.92	2.65	0.14	0.27	1.03	3.09	0.14	0.32	1.12	3.54	14
15	0.20	0.15	0.13	0.23	0.87	0.14	0.24	1.01	2.62	0.16	0.27	1.13	3.07	0.16	0.32	1.23	3.52	15
16	0.20	0.15	0.13	0.23	0.94	0.14	0.24	1.09	2.62	0.16	0.27	1.22	3.07	0.16	0.32	1.34	3.52	16
18	0.20	0.15	—	—	—	0.14	0.24	1.26	2.62	—	—	—	—	0.16	0.32	1.57	3.52	18
20	0.30	0.20	—	—	—	0.18	0.27	1.43	2.55	—	—	—	—	0.18	0.36	1.79	3.46	20
22	0.30	0.20	—	—	—	0.18	0.27	1.59	2.55	—	—	—	—	0.18	0.36	2.01	3.46	22
25	0.30	0.20	—	—	—	0.18	0.27	1.85	2.55	—	—	—	—	0.18	0.36	2.35	3.46	25
28	0.30	0.20	—	—	—	0.18	0.27	2.10	2.55	—	—	—	—	0.18	0.36	2.68	3.46	28
30	0.30	0.20	—	—	—	0.18	0.27	2.26	2.55	—	—	—	—	0.18	0.36	2.91	3.46	30
35	0.38	0.25	—	—	—	0.22	0.27	2.68	2.51	—	—	—	—	0.22	0.36	3.47	3.42	35
38	0.38	0.25	—	—	—	0.22	0.27	2.94	2.51	—	—	—	—	0.22	0.36	3.80	3.42	38

Footnotes 1) to 6) see page 6, for key to colour coding see page 4

This document contains colours that are necessary for its correct interpretation.

Table 7. Material group III

Outside diameter	Wall thickness s										Outside diameter d ₁	
	1.5		2		2.5		3		3.5			
d ₁	Perm. for d ₁ mean	Perm. + var. for U mean	Min. wall thickness	Weight kg/m	Perm. for U mean	Perm. + var. for U mean	Min. wall thickness	Weight kg/m	Perm. for U mean	Perm. + var. for U mean	Min. wall thickness	Weight kg/m
42	0.25	0.14	1.21	1.70	0.18	0.23	2.09	3.27	0.22	0.27	2.51	4.42
44.5	0.38	0.25	1.21	1.80	0.18	0.23	2.09	3.48	0.22	0.27	2.51	4.45
57	0.45	0.30	1.17	2.33	0.22	0.25	3.81	4.53	0.25	0.27	2.48	5.24
76	0.45	0.30	—	—	0.22	0.25	5.14	6.12	0.25	0.27	2.48	7.09
89	0.60	0.40	—	—	0.25	0.25	6.05	7.21	0.29	0.27	2.42	8.37
108	0.80	0.40	—	—	0.27	0.25	7.37	8.81	0.29	0.27	2.42	10.2
114	0.80	0.40	—	—	0.27	0.25	7.79	9.31	0.29	0.27	2.42	10.8
133	1.5	0.75	—	—	0.32	0.25	9.12	10.9	0.36	0.30	2.34	12.7
159	1.5	0.75	—	—	0.32	0.25	10.9	13.1	0.36	0.30	2.34	15.2
168	1.5	0.75	—	—	0.32	0.25	11.6	13.8	0.36	0.30	2.34	16.1
194	n.v.	0.75	—	—	0.32	0.25	13.4	16.0	0.36	0.30	2.34	18.6

Table 8. Material group III

Outside diameter	Wall thickness s										Outside diameter d ₁	
	3		3.5		4		5		6			
d ₁	Perm. for d ₁ mean	Perm. + var. for U mean	Min. wall thickness	Weight kg/m	Perm. for U mean	Perm. + var. for U mean	Min. wall thickness	Weight kg/m	Perm. for U mean	Perm. + var. for U mean	Min. wall thickness	Weight kg/m
219	2.4	1.2	0.43	0.36	181	221	2.61	24.0	0.47	0.48	3.05	29.9
267	n.v.	1.2	0.43	0.36	221	221	2.61	29.4	0.47	0.48	3.05	36.6
273	n.v.	1.2	0.43	0.36	22.6	2.21	2.61	30.1	0.47	0.48	3.05	37.4
324	n.v.	2.0	—	—	—	—	—	35.8	0.58	0.60	3.62	44.6
368	n.v.	2.0	—	—	—	—	—	40.7	0.58	0.60	3.62	50.6
419	n.v.	2.0	—	—	—	—	—	46.4	0.58	0.60	3.62	57.9

Key for colour coding see page 4

Footnotes for Tables 1 to 8

- 1) Permissible variations on the diameter d₁ total
d₁ total is the diameter including out-of-roundness. Each measured diameter must lie within the permissible variations.
- 2) Permissible variations on the mean diameter d₁ mean
The mean diameter is the arithmetic mean of the maximum and minimum diameter measured in the same plane perpendicular to the axis of the tube. When the diameters are measured, a distance of a minimum of d₁ and a maximum of 100 mm from either end of the tube must be ignored.

- 3) Permissible variations on the mean wall thickness s mean
The mean wall thickness is the arithmetic mean of the maximum and minimum wall thickness measured in the same plane perpendicular to the axis of the tube.
- 4) Permissible thickness variation
The thickness variation U is the variation of the maximum or minimum wall thickness from the mean wall thickness, determined in the same plane perpendicular to the axis of the tube.
- 5) Calculated with a density of 8.90 kg/dm³. For materials with a different density, the weights should be calculated using the conversion factors in Table 10 (see also Section 6).
- 6) The minimum wall thicknesses given in this column may occur within one delivery and should therefore only be used as a basis for design calculations.

3.2. Permissible variation from straightness

For tubes of outside diameter d_1 over 10 mm in manufacturing, approximate and fixed lengths (except tubes in the soft condition) the permissible variations in Table 9 apply.

h_1 is the permissible variation per metre, increasing linearly for measured lengths l_1 over 400 mm. Over any length $l_2 = 400$ mm, the permissible variation must not however exceed h_2 , see diagram.

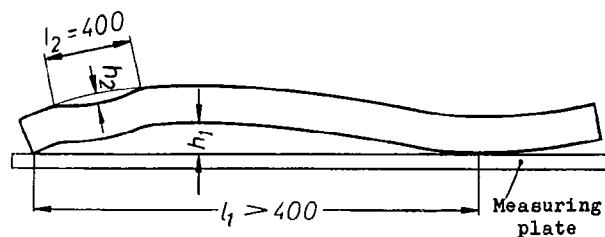


Table 9

Ratio $d_1 : s$		Permissible variation per metre each 400 mm	
above	up to	h_1	h_2
—	5	2	0,8
5	10	3	1,2
10	20	4	1,6
20	40	5	2,0
40	—	6	2,5

4. Materials and strength properties

(to be stated when ordering)

Copper wrought alloys according to DIN 17671 Sheet 1

The material groups II and III take account of the differing working characteristics of the alloys according to their composition (see symbols in Table 10).

5. Finish

According to technical conditions of delivery DIN 17671 Sheet 2.

6. Weights and permissible variations

The weights given in Tables 1 to 8 are calculated from the nominal dimensions of the outside diameter and the wall thickness of the tubes concerned and the density of the material. For conversion factors see Table 10.

The permissible variation on weight is obtained from the permissible variations on the nominal dimensions and the permissible variations on the composition of the alloy.

Table 10

Material group	Symbols		Material number	Density kg/dm^3	Conversion factor
	new	former			
II	CuNi10Fe		2.0872	8,9	1
III	CuAsP	SB-Cu	2.1491	8,9	1
	CuZn20Al	SoMs76	2.0460	8,3	0,932

7. Mode of delivery

7.1. Tubes in manufacturing lengths: from 2000 to 8000 mm

Supply of short lengths of at least 1000 mm is permissible up to 10 % of the delivered weight.

7.2. Tubes in approximate lengths: up to 8000 mm

Approximate lengths must be specially agreed when ordering. For the purpose of marking, the word "approximate" should then be added after the length.

The permissible variation from the ordered length is ± 10 %.

For tubes of diameter up to 100 mm, short lengths of at least 1000 mm may be supplied up to 10 % of the delivered weight. For tubes of diameter over 100 mm, the permissible short lengths must be specially agreed.

7.3. Tubes in fixed lengths

Fixed lengths must be specially agreed when ordering. For the purpose of marking, the word "fixed" should then be added after the length. For fixed lengths, the permissible variations in Table 11 apply.

With fixed lengths, saw cuts may vary from a right angle only by half the permissible variation given in Table 11.

7.4. Example of order

2t seamless drawn tubes of outside diameter $d_1 = 20$ mm, wall thickness $s = 2$ mm to coordination of tolerance A in manufacturing lengths in the material with the symbol CuZn20Al F35 or the material number 2.0460.10:

2t Tubes 30 x 2 DIN 1755 - CuZn20Al F35

or 2t Tubes 30 x 2 DIN 1755 - 2.0460.10

Table 11

Outside diameter d_1	Permissible plus variations for fixed lengths above							by agreement	
	—	100	250	500	1000	2000	4000		
above	to	up to							—
		100	250	500	1000	2000	4000	—	
—	10	by agreement							by agreement
10	50	1	1,5	2	3	4	5		
50	120	1,5	2	3	4	5	6		
120	250	2	3	4	5	6	7		
250	450	3	4	5	6	7	8		

Explanations

This issue of the standard takes account of the fact that only two of the cross-section dimensions of a tube should be subject to a tolerance, see coordination of tolerances A, B and C. With the introduction of this coordination of tolerances the previous redundancy of dimensioning, i.e. simultaneous stipulation of permissible variations on outside diameter, inside diameter and wall thickness, is avoided.

For further details reference should be made to the comments of F. Ballas⁷⁾ and those of H.J. Fischer and R.M. Zollinger⁸⁾. Here, the only point that need be made is that the permissible variations are influenced both by the tool and the manufacturing process. For this reason, a distinction is now made between dimension tolerances dependent on the tool, i.e. the permissible variations from the mean diameter or the mean wall thickness and variations in shape dependent on the manufacturing process, i.e. the permissible variations in the diameter including out-of-roundness or the permissible wall thickness variation (eccentricity).

With agreement having been reached on the new system of tolerances, it was then necessary to make the standards both more universal on the one hand and more specialized on the other, than previously, i.e. to provide tolerances to the standard for intermediate dimensions by quoting dimension ranges and also to stipulate preferred dimensions for particular applications e.g. for pipelines.

These aims were achieved by dividing up the previous standard DIN 1755 into a number of Sheets as follows:

Sheet 1: Dimension ranges and coordination of tolerances

The dimension ranges enable the permissible variation applicable in any particular case to be read off or calculated for any required dimension. This is particularly important for tubes to coordination of tolerances B and C for which it was not possible to stipulate any preferred dimensions.

Sheet 2: Preferred dimensions for general application

Since in general, tubes to coordination of tolerance A are used, this Standard stipulates preferred dimensions for outside diameter and wall thickness arranged according to preferred numbers and including dimensions corresponding to the international range of diameters for pipelines.

On the basis of the provisions of Sheet 1, for each dimension, the permissible variations on outside diameter and wall thickness are given. In addition, the minimum possible wall thickness for the given tube cross-section and the weight are calculated in order to provide the user of the standard with some essential design data.

Sheet 3: Preferred dimensions for pipelines

The preferred dimensions for the outside diameter were deliberately brought into line with the series which has been internationally adopted for pipelines. This harmonization was necessary since all joints e.g. unions and flanges, are matched to these outside diameters. For the rest of the contents of this Standard the same principles apply as for Sheet 2.

Because of this subdivision, it was decided to present each Sheet in such a manner as to enable it to be used independently of the other Sheets. It is thus possible, according to requirements, to alter, i.e. to delete and/or add to the preferred dimensions in Sheet 2 and/or Sheet 3.

In the course of revision, it was also necessary to provide for a division of the materials into several groups to take account of the working characteristics of the alloys.

7) See DIN-Mitt. Vol. 41 (1962) No. 8/9, pp. 357-362

8) See DIN-Mitt. Vol. 45 (1966) No. 11, pp. 597-603