

Foreword & Standard Status

This European Standard EN 10220:2002 was prepared by Technical Committee ECISS/TC 29 "Steel tubes and fittings for steel tubes". This standard supersedes ENV 10220:1993. It serves as a general dimensional standard to be used in conjunction with specific technical delivery conditions for seamless and welded steel tubes (such as EN 10210, EN 10216, EN 10217, EN 10297, etc.).

1. Scope & 2. Normative References

Scope: This European Standard specifies preferred outside diameters D and wall thicknesses T in millimetres for seamless and welded circular steel tubes for general applications (e.g. pressure, mechanical, and structural) and gives masses per unit length in kg/m of plain end tube.

Normative Reference: EN 10088-1:1995 *Stainless steels - Part 1: List of stainless steels*.

3. Terms and Definitions

For the purposes of this European Standard, the following definitions apply:

Outside Diameter (D): The nominal outside diameter of the circular cross-section of the tube.

Wall Thickness (T): The nominal thickness of the tube wall.

Mass per Unit Length of Plain End Tube (M): Theoretical mass per metre computed from nominal outside diameter and wall thickness without tolerances.

4. Calculation of Mass per Unit Length

The values for mass per unit length M given in Table 1 and Table 2 are computed from nominal outside diameter D and nominal wall thickness T using a standard carbon steel density of **7.85 kg/dm³**:

$$M = (D - T) \times T \times 0.02466151 \text{ kg/m}$$

Density Correction Factors for Stainless Steels: Where the density of the steel grade differs from 7.85 kg/dm³ (e.g. stainless steels), the calculated mass M shall be multiplied by the coefficient from EN 10088-1:

Stainless Steel Group	Reference Density	Factor
Austenitic Stainless Steel	7.97 kg/dm ³	1.015
Ferritic / Martensitic Stainless Steel	7.73 kg/dm ³	0.985

5. Classification of Outside Diameters

- **Series 1:** Outside diameters for which all pipework components are fully standardized. **Recommended for primary engineering selection.**
- **Series 2:** Outside diameters for which not all pipework components are standardized.
- **Series 3:** Outside diameters for which very few standardized components exist.

TABLE 1: DIMENSIONS AND MASS PER UNIT LENGTH (OD 10.2MM - 114.3MM)

Outside Diameter D (mm)			Wall Thickness T (mm) & Mass per Unit Length (kg/m)										
Series 1	Series 2	Series 3	0.5	0.8	1.0	1.2	1.6	2.0	2.6	3.2	4.0	5.0	6.3
10.2	-	-	0.120	0.185	0.227	0.266	0.339	0.404	-	-	-	-	-
-	12.0	-	0.142	0.221	0.271	0.320	0.410	0.493	-	-	-	-	-
-	-	12.7	0.150	0.235	0.289	0.340	0.438	0.528	-	-	-	-	-
13.5	-	-	0.160	0.251	0.308	0.364	0.470	0.567	0.699	0.813	-	-	-
-	14.0	-	0.166	0.260	0.321	0.379	0.489	0.592	0.731	0.852	-	-	-
-	-	15.0	0.179	0.280	0.345	0.408	0.529	0.641	0.795	0.931	-	-	-
-	16.0	-	0.191	0.300	0.370	0.438	0.568	0.691	0.859	1.01	-	-	-
17.2	-	-	0.206	0.324	0.399	0.474	0.616	0.750	0.936	1.10	1.30	-	-
-	-	18.0	0.216	0.339	0.419	0.497	0.647	0.789	0.987	1.17	1.38	-	-
-	19.0	-	0.228	0.359	0.444	0.527	0.687	0.838	1.05	1.25	1.48	-	-
-	-	20.0	0.240	0.379	0.469	0.556	0.726	0.888	1.11	1.33	1.58	-	-
21.3	-	-	0.256	0.404	0.501	0.595	0.777	0.952	1.20	1.43	1.71	2.01	-
-	-	22.0	0.265	0.418	0.518	0.616	0.805	0.986	1.24	1.48	1.78	2.10	-
-	25.0	-	0.302	0.477	0.592	0.704	0.923	1.13	1.44	1.72	2.07	2.47	-
-	-	25.4	0.307	0.485	0.602	0.716	0.939	1.15	1.46	1.75	2.11	2.52	-
26.9	-	-	-	0.515	0.639	0.761	0.998	1.23	1.56	1.87	2.26	2.70	3.20
-	-	30.0	-	0.576	0.715	0.852	1.12	1.38	1.76	2.12	2.56	3.08	3.68
-	31.8	-	-	0.612	0.759	0.906	1.19	1.47	1.87	2.26	2.74	3.30	3.96
33.7	-	-	-	0.649	0.806	0.962	1.27	1.56	1.99	2.41	2.93	3.54	4.26
-	38.0	-	-	0.734	0.912	1.09	1.44	1.78	2.27	2.75	3.35	4.07	4.92
-	-	40.0	-	0.773	0.962	1.15	1.52	1.87	2.40	2.90	3.55	4.32	5.24
42.4	-	-	-	0.821	1.02	1.22	1.61	1.99	2.55	3.09	3.79	4.61	5.61
-	-	44.5	-	0.862	1.07	1.28	1.69	2.10	2.69	3.26	4.00	4.87	5.93
48.3	-	-	-	0.937	1.17	1.39	1.84	2.28	2.93	3.56	4.37	5.34	6.53
-	51.0	-	-	0.990	1.23	1.47	1.95	2.42	3.10	3.77	4.64	5.67	6.95
-	-	54.0	-	1.05	1.31	1.56	2.07	2.56	3.29	4.01	4.93	6.04	7.41
-	57.0	-	-	1.11	1.38	1.65	2.19	2.71	3.48	4.25	5.23	6.41	7.88
60.3	-	-	-	1.17	1.46	1.75	2.32	2.88	3.70	4.51	5.55	6.82	8.39
-	63.5	-	-	-	1.54	1.84	2.44	3.03	3.90	4.76	5.87	7.21	8.89
-	-	70.0	-	-	1.70	2.04	2.70	3.35	4.32	5.27	6.51	8.01	9.90
-	73.0	-	-	-	1.78	2.12	2.82	3.50	4.51	5.51	6.81	8.38	10.4
76.1	-	-	-	-	1.85	2.22	2.94	3.65	4.71	5.75	7.11	8.77	10.8
-	82.5	-	-	-	2.01	2.41	3.19	3.97	5.12	6.26	7.74	9.56	11.8
88.9	-	-	-	-	2.17	2.59	3.44	4.29	5.53	6.76	8.38	10.3	12.8
-	-	95.0	-	-	2.32	2.78	3.68	4.59	5.92	7.24	8.98	11.1	13.8
-	101.6	-	-	-	2.48	2.97	3.95	4.91	6.35	7.77	9.63	11.9	14.8
-	108.0	-	-	-	2.64	3.16	4.20	5.23	6.76	8.27	10.3	12.7	15.8
114.3	-	-	-	-	2.79	3.35	4.45	5.54	7.16	8.77	10.9	13.5	16.8

TABLE 1 (CONTINUED): DIMENSIONS AND MASS PER UNIT LENGTH (OD 133MM - 2540MM)

Outside Diameter D (mm)			Wall Thickness T (mm) & Mass per Unit Length (kg/m)										
Series 1	Series 2	Series 3	4.5	6.3	8.0	10.0	12.5	16.0	20.0	25.0	32.0	40.0	63.0
-	133.0	-	14.3	19.7	24.7	30.3	37.1	46.2	55.7	-	-	-	-
139.7	-	-	15.0	20.7	26.0	32.0	39.2	48.8	59.0	70.7	-	-	-
-	152.4	-	16.4	22.7	28.5	35.1	43.1	53.8	65.3	78.5	-	-	-
-	-	159.0	17.1	23.7	29.8	36.7	45.2	56.4	68.6	82.6	-	-	-
168.3	-	-	18.2	25.2	31.6	39.0	48.0	60.1	73.1	88.3	108	-	-
-	177.8	-	19.2	26.6	33.5	41.4	51.0	63.8	77.8	94.2	115	-	-
-	193.7	-	21.0	29.1	36.6	45.3	55.9	70.1	85.7	104	128	152	-
219.1	-	-	23.8	33.1	41.6	51.6	63.7	80.1	98.2	120	148	177	242
-	244.5	-	26.6	37.0	46.7	57.8	71.5	90.2	111	135	168	202	282
273.0	-	-	29.8	41.4	52.3	64.9	80.3	101	125	153	190	230	326
-	298.5	-	32.6	45.4	57.3	71.1	88.2	111	137	169	210	255	366
323.9	-	-	35.4	49.3	62.3	77.4	96.0	121	150	184	230	280	405
-	355.6	-	39.0	54.3	68.6	85.2	106	134	165	204	255	311	455
406.4	-	-	44.6	62.2	78.6	97.8	121	154	191	235	295	361	533
-	457.0	-	50.2	70.0	88.6	110	137	174	216	266	335	411	612
508.0	-	-	55.9	77.9	98.6	123	153	194	241	298	376	462	691
-	559.0	-	61.5	85.9	109	135	168	214	266	329	416	512	770
610.0	-	-	67.2	93.8	119	148	184	234	291	361	456	562	850
-	660.0	-	72.7	102	129	160	200	254	316	392	496	612	927
711.0	-	-	78.4	109	139	173	215	274	341	423	536	662	1006
-	762.0	-	84.1	117	149	185	231	294	366	454	576	712	1086
813.0	-	-	89.7	125	159	198	247	314	391	486	616	763	1165
-	864.0	-	95.4	133	169	211	263	335	416	517	657	813	1244
914.0	-	-	101	141	179	223	278	354	441	548	696	862	1322
1016.0	-	-	112	157	199	248	309	395	491	611	777	963	1480
-	1067.0	-	118	165	209	261	325	415	516	642	817	1013	1559
1220.0	-	-	135	189	239	298	372	475	592	737	938	1164	1797
1422.0	-	-	157	220	279	348	435	555	692	861	1097	1363	2111
1626.0	-	-	180	252	319	399	497	635	792	987	1258	1565	2428
1829.0	-	-	202	283	359	449	560	715	892	1112	1418	1765	2743
2032.0	-	-	225	315	399	499	623	795	992	1237	1578	1965	3058
2235.0	-	-	247	346	439	549	685	876	1093	1363	1739	2165	3374
2540.0	-	-	281	394	500	624	779	996	1243	1551	1979	2466	3847

TABLE 2: HEAVY WALL THICKNESS TUBES (70MM ≤ T ≤ 100MM)

Applicable to seamless steel tubes with heavy wall thickness. Mass per unit length given in kg/m based on density 7.85 kg/dm³.

Outside Diameter D (mm)	Wall Thickness T (mm) & Mass per Unit Length (kg/m)			
	70 mm	80 mm	90 mm	100 mm
219.1	257	-	-	-
244.5	301	325	-	-
273.0	350	381	-	-
298.5	394	431	-	-
323.9	438	481	519	552
355.6	493	544	590	630
406.4	581	644	702	765
457.0	668	744	815	880
508.0	756	844	928	1006
559.0	844	945	1041	1132
610.0	932	1046	1154	1258
660.0	1019	1144	1265	1381
711.0	1107	1245	1378	1507

TECHNICAL NOTES & APPLICATION GUIDANCE

Procurement and Design Reference Notes

- 1. Dimensional Tolerances:** EN 10220 only specifies nominal dimensions and theoretical masses. For dimensional tolerances, out-of-roundness, and delivery requirements, consult the corresponding product specifications (e.g. EN 10216 / EN 10297 for seamless tubes, EN 10217 / EN 10219 for welded tubes).
- 2. International Alignment:** Technical contents of this standard are aligned with ISO 4200:1991 *Seamless and welded steel tubes - Dimensions and masses per unit length*.
- 3. Plain End Condition:** Mass values do not account for extra weight added by end preparation (e.g. bevels, threads, couplings).

BIBLIOGRAPHY

- ISO 4200:1991, *Seamless and welded steel tubes – Dimensions and masses per unit length*.
- EN 10210-2, *Hot finished structural hollow sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and sectional properties*.
- EN 10216 (All Parts), *Seamless steel tubes for pressure purposes – Technical delivery conditions*.
- EN 10217 (All Parts), *Welded steel tubes for pressure purposes – Technical delivery conditions*.
- EN 10297-1, *Seamless circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions*.