

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1127

STAINLESS STEEL TUBES

DIMENSIONS, TOLERANCES AND CONVENTIONAL MASSES
PER UNIT LENGTH

1st EDITION

October 1969

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BRIEF HISTORY

The ISO Recommendation R 1127, *Stainless steel tubes – Dimensions, tolerances and conventional masses per unit length*, was drawn up by Technical Committee ISO/TC 5, *Pipes and fittings*, the Secretariat of which is held by the Association Suisse de Normalisation (SNV).

Work on this question led to the adoption of a Draft ISO Recommendation.

In January 1968, this Draft ISO Recommendation (No. 1492) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Germany	South Africa, Rep. of
Belgium	India	Sweden
Brazil	Israel	Switzerland
Canada	Italy	Thailand
Chile	Korea, Rep. of	Turkey
Colombia	Netherlands	U.A.R.
Czechoslovakia	Norway	United Kingdom
Denmark	Poland	
France	Portugal	

Two Member Bodies opposed the approval of the Draft :

Hungary
U.S.S.R.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in October 1969, to accept it as an ISO RECOMMENDATION.

STAINLESS STEEL TUBES

DIMENSIONS, TOLERANCES AND CONVENTIONAL MASSES PER UNIT LENGTH

INTRODUCTION

The outside diameters and thicknesses of the tubes are selected from ISO Recommendation R 336, *Plain end steel tubes, welded or seamless – General table of dimensions and masses per unit length*. The diameters 6, 8, 10, 14, 18, 22, 28, 32, 35 and 40 mm have been added from ISO Recommendation R 560, *Cold drawn precision steel tubes – Metric series – Dimensions and masses per metre*, and the diameters 0.250, 0.312, 0.375, 0.500, 0.625 and 0.875 in have been added from ISO Recommendation R . . .*, *Pipe connections for industrial application for plain end steel and other metal tubes*.

The corresponding thicknesses in millimetres and in inches are in accordance with ISO Recommendation R 221, *Steel tubes – Thicknesses*. The thicknesses above 6.3 mm (0.250 in) should be chosen from ISO Recommendation R 221.

1. SCOPE

This ISO Recommendation concerns stainless steel tubes and gives diameters, thicknesses, tolerances and conventional masses per unit length.

2. TOLERANCES

The tolerances permitted on the outside diameter and thickness of the tubes result from the method of manufacture, the steel types, the heat treatment and pickling. The tolerances should be selected from the following :

2.1 Tolerances on outside diameter

D_0	: ± 2 %	with a minimum of ± 1.0 mm (0.04 in)
D_1	: ± 1.5 %	with a minimum of ± 0.75 mm (0.03 in)
D_2	: ± 1.0 %	with a minimum of ± 0.50 mm (0.02 in)
D_3	: ± 0.75 %	with a minimum of ± 0.30 mm (0.012 in)
D_4	: ± 0.50 %	with a minimum of ± 0.10 mm (0.004 in)

2.2 Tolerances on thickness

T_0	: ± 20 %
T_1	: ± 15 %
T_2	: ± 12.5 %
T_3	: ± 10 %
T_4	: ± 7.5 %

3. CONVENTIONAL MASSES PER UNIT LENGTH

The conventional masses per unit length are those of ISO Recommendation R 336, *Plain end steel tubes, welded or seamless – General table of dimensions and masses per unit length*, modified according to the following coefficients :

austenitic steel (see Table 1) :	1.015
ferritic and martensitic steel (see Table 2) :	0.985

The conventional masses per unit length of tubes of which the outside diameter is contained in ISO Recommendation R 64, *Steel tubes – Outside diameters*, have been calculated according to the method given in ISO Recommendation R 336 and modified according to the corresponding coefficients for the kind of steel.

* In preparation.

TABLE 1 – Stainless austenitic steel tubes

Outside diameter		Thicknesses															
mm	in	mm	0.5	0.8	1.0	1.2	1.6	2	2.3	2.6	2.9	3.2	3.6	4	4.5	5	6.3
mm	in	in	0.020	0.032	0.040	0.048	0.064	0.080	0.092	0.104	0.116	0.128	0.144	0.160	0.176	0.192	0.250
Conventional masses per unit length																	
6	—	kg/m	0.069	0.104	0.125	0.144	0.176										
—	0.250*	lb/ft	0.050	0.076	0.091	0.105	0.129										
—	0.312*	lb/ft	0.063	0.097	0.118	0.137	0.172										
8	—	kg/m	0.094	0.144	0.175	0.204	0.256										
—	0.375*	lb/ft	0.077	0.119	0.145	0.170	0.216										
10	—	kg/m	0.119	0.184	0.225	0.264	0.336	0.401	0.443								
10.2	0.402	kg/m	0.122	0.190	0.232	0.272	0.347	0.413	0.458								
		lb/ft	0.082	0.127	0.156	0.183	0.233	0.278	0.307								
12	—	kg/m	0.144	0.224	0.275	0.324	0.417	0.501	0.559								
—	0.500*	lb/ft	0.104	0.162	0.199	0.235	0.303	0.364	0.407								
13.5	0.531	kg/m	0.164	0.256	0.315	0.372	0.479	0.579	0.648	0.713	0.773						
		lb/ft	0.110	0.172	0.212	0.250	0.322	0.389	0.436	0.479	0.519						
14	—	kg/m	0.169	0.264	0.325	0.384	0.497	0.601	0.674	0.742	0.806						
—	0.625*	lb/ft	0.131	0.206	0.254	0.300	0.389	0.473	0.532	0.587	0.640						
16	—	kg/m	0.194	0.304	0.376	0.445	0.577	0.701	0.789	0.872	0.951						
		kg/m	0.211	0.331	0.408	0.484	0.629	0.766	0.863	0.956	1.04	1.13					
17.2	0.677	lb/ft	0.142	0.222	0.274	0.325	0.423	0.515	0.580	0.642	0.701	0.758					
18	—	kg/m	0.219	0.344	0.426	0.505	0.657	0.801	0.904	1.00	1.10	1.19					
		kg/m	0.234	0.368	0.454	0.539	0.703	0.858	0.969	1.08	1.18	1.28					
19	0.750	lb/ft	0.157	0.247	0.305	0.362	0.472	0.577	0.651	0.723	0.791	0.857					
20	—	kg/m	0.244	0.385	0.476	0.565	0.737	0.901	1.02	1.13	1.24	1.35	1.48	1.60	1.75	1.88	2.16
		kg/m	0.263	0.414	0.512	0.609	0.795	0.974	1.10	1.23	1.35	1.46	1.60	1.74	1.89	2.04	2.37
21.3	0.840	lb/ft	0.176	0.278	0.344	0.409	0.534	0.654	0.741	0.824	0.904	0.981	1.08	1.17	1.27	1.35	1.59

* To be maintained only while inch units are still in use.

NOTE. — The 16 mm and 5/8 in (0.625 in) diameters were previously taken as corresponding values for hot-finished tubes but are not sufficiently close corresponding values for certain applications of precision tubes.

TABLE 1 — Stainless austenitic steel tubes (continued)

Outside diameter		Thicknesses																		Conventional masses per unit length																	
		mm		0.5	0.8	1.0	1.2	1.6	2	2.3	2.6	2.9	3.2	3.6	4	4.5	—	5	5.6																		
		in	0.020	0.032	0.040	0.048	0.064	0.080	0.092	0.104	0.116	0.128	0.144	0.160	0.176	0.192	—	—	—	0.250																	
mm	in																																				
22	—	kg/m	0.269	0.425	0.526	0.625	0.817	1.00	1.13	1.26	1.39	1.51	1.66	1.80	1.97	—	2.13	2.30	2.48																		
—	0.875*	lb/ft	0.185	0.292	0.362	0.430	0.563	0.690	0.781	0.869	0.955	1.04	1.14	1.24	1.33	1.42	—	1.56	1.69																		
25	—	kg/m	0.307	0.485	0.601	0.715	0.937	1.15	1.31	1.46	1.60	1.75	1.93	2.10	2.31	—	2.50	2.72	2.95																		
25.4	1.000	kg/m	0.314	0.496	0.615	0.732	0.960	1.18	1.34	1.49	1.64	1.79	1.98	2.16	2.35	—	2.55	2.77	3.02																		
—	—	lb/ft	0.211	0.333	0.413	0.492	0.645	0.793	0.900	1.00	1.10	1.20	1.33	1.45	1.58	1.68	—	1.86	2.03																		
26.9	1.059	kg/m	0.333	0.527	0.653	0.777	1.02	1.26	1.43	1.59	1.75	1.91	2.11	2.31	2.52	—	2.74	2.98	3.26																		
—	—	lb/ft	0.224	0.354	0.439	0.522	0.686	0.843	0.958	1.07	1.18	1.28	1.42	1.55	1.69	1.80	—	2.00	2.19																		
28	—	kg/m	0.344	0.545	0.676	0.805	1.06	1.30	1.48	1.65	1.82	1.99	2.20	2.40	2.65	—	2.88	3.14	3.42																		
30	—	kg/m	0.369	0.585	0.726	0.865	1.14	1.40	1.59	1.78	1.97	2.15	2.38	2.60	2.87	—	3.13	3.42	3.74																		
31.8	1.250	kg/m	0.394	0.625	0.776	0.925	1.22	1.50	1.71	1.91	2.11	2.30	2.56	2.80	3.06	—	3.35	3.66	4.03																		
—	—	lb/ft	0.265	0.420	0.521	0.622	0.818	1.01	1.15	1.28	1.42	1.55	1.72	1.88	2.06	2.20	—	2.46	2.71																		
32	—	kg/m	0.394	0.625	0.776	0.925	1.22	1.50	1.71	1.91	2.11	2.31	2.56	2.80	3.10	—	3.38	3.70	4.05																		
33.7	1.327	kg/m	0.419	0.664	0.825	0.983	1.29	1.60	1.82	2.04	2.25	2.46	2.73	2.99	3.28	—	3.59	3.93	4.33																		
—	—	lb/ft	0.281	0.446	0.554	0.661	0.870	1.07	1.22	1.37	1.51	1.65	1.83	2.01	2.20	2.36	—	2.64	2.91																		
35	—	kg/m	0.432	0.685	0.851	1.02	1.34	1.65	1.88	2.11	2.33	2.55	2.83	3.10	3.44	—	3.75	4.12	4.53																		
38	1.500	kg/m	0.473	0.751	0.934	1.11	1.47	1.82	2.07	2.32	2.57	2.81	3.13	3.43	3.77	—	4.13	4.53	5.02																		
—	—	lb/ft	0.318	0.505	0.628	0.749	0.988	1.22	1.39	1.56	1.73	1.89	2.10	2.31	2.53	2.72	—	3.05	3.37																		
40	—	kg/m	0.494	0.785	0.976	1.17	1.54	1.90	2.17	2.43	2.69	2.95	3.28	3.60	4.00	—	4.38	4.82	5.31																		
42.4	1.669	kg/m	0.528	0.839	1.04	1.25	1.65	2.04	2.32	2.61	2.89	3.16	3.52	3.87	4.25	—	4.68	5.14	5.71																		
—	—	lb/ft	0.355	0.564	0.701	0.838	1.11	1.37	1.56	1.75	1.94	2.12	2.37	2.60	2.86	3.07	—	3.45	3.84																		
44.5	1.750	kg/m	0.554	0.881	1.10	1.31	1.73	2.14	2.45	2.74	3.04	3.33	3.71	4.08	4.49	—	4.94	5.43	6.04																		
—	—	lb/ft	0.373	0.592	0.737	0.880	1.16	1.44	1.64	1.84	2.04	2.24	2.49	2.74	3.02	3.24	—	3.65	4.06																		
48.3	1.900	kg/m	0.603	0.958	1.19	1.42	1.88	2.33	2.67	2.99	3.32	3.64	4.05	4.46	4.91	—	5.42	5.96	6.64																		
—	—	lb/ft	0.405	0.644	0.801	0.957	1.27	1.57	1.79	2.01	2.23	2.44	2.72	3.00	3.30	3.56	—	4.01	4.46																		
51	2.000	kg/m	—	—	—	1.50	1.99	2.47	2.82	3.17	3.51	3.85	4.29	4.73	5.21	—	5.76	6.33	7.05																		
—	—	lb/ft	—	—	—	1.01	1.34	1.66	1.89	2.13	2.36	2.59	2.88	3.18	3.50	3.76	—	4.25	4.74																		

* To be maintained only while inch units are still in use.

Thicknesses

Outside diameter		Thicknesses																	
		mm	0.5	0.8	1.0	1.2	1.6	2	2.3	2.6	2.9	3.2	3.6	4	4.5	5	5.6	6.3	
in		mm	0.020	0.032	0.040	0.048	0.064	0.080	0.092	0.104	0.116	0.128	0.144	0.160	0.176	0.192	—	0.219	0.250
Conventional masses per unit length																			
219.1	8.625	kg/m	8.78	10.9	12.6	14.2	15.8	17.4	19.6	21.7	24.1	26.8	29.8	33.7	37.7	42.2	47.9	53.3	58.7
		lb/ft																	
244.5	9.625	kg/m	9.80	12.2	14.0	15.9	17.7	19.5	21.9	24.3	26.9	30.0	33.4	37.4	42.4	47.4	52.4	57.4	62.4
		lb/ft																	
273	10.750	kg/m	11.0	13.7	15.7	17.7	19.8	21.8	24.5	27.1	30.1	33.5	37.3	42.2	47.2	52.2	57.2	62.2	67.2
		lb/ft																	
323.9	12.750	kg/m	13.0	16.2	18.7	21.1	23.5	25.9	29.1	32.3	35.8	39.9	44.4	50.3	55.3	60.3	65.3	70.3	75.3
		lb/ft																	
355.6	14.000	kg/m	8.74	10.9	12.5	14.2	15.8	17.4	19.5	21.5	23.8	26.5	28.7	32.8	37.1	41.4	45.7	50.0	54.3
		lb/ft																	
406.4	16.000	kg/m	14.3	17.8	20.5	23.1	25.8	28.4	32.0	35.5	39.4	43.9	48.9	55.3	63.3	71.4	79.4	87.4	95.5
		lb/ft																	
457.2	18.000	kg/m	9.60	20.4	23.4	26.5	29.5	32.5	36.6	40.6	45.1	50.2	56.0	63.3	71.4	79.4	87.4	95.5	103.6
		lb/ft																	
508	20.000	kg/m	13.7	15.7	17.8	19.8	21.9	24.6	27.7	30.7	34.1	37.1	42.4	47.9	53.3	58.7	64.2	69.7	75.2
		lb/ft																	
558.8	22.000	kg/m	23.0	26.4	29.8	33.2	36.6	40.7	45.8	50.8	56.5	63.0	70.2	79.4	87.4	95.5	103.6	111.7	119.8
		lb/ft																	
609.6	24.000	kg/m	17.1	19.7	22.3	24.8	27.4	30.1	33.9	37.6	41.8	45.4	51.9	58.7	65.5	72.3	79.1	85.9	92.7
		lb/ft																	

TABLE 2 - Stainless ferritic and martensitic steel tubes

Outside diameter		Thicknesses																
		mm	0.5	0.8	1.0	1.2	1.6	2	2.3	2.6	2.9	3.2	3.6	4	4.5	5	5.6	6.3
		in	0.020	0.032	0.040	0.048	0.064	0.080	0.092	0.104	0.116	0.128	0.144	0.160	0.176	0.192	0.219	0.250
		mm	Conventional masses per unit length															
		in	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft
		in	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft	kg/m	lb/ft
6	—	—	0.067	0.101	0.125	0.140	0.171											
—	0.250*	—	0.048	0.073	0.088	0.102	0.125											
—	0.312*	—	0.061	0.094	0.115	0.133	0.167											
8	—	—	0.091	0.140	0.170	0.198	0.249											
—	0.375*	—	0.075	0.115	0.141	0.165	0.209											
10	—	—	0.115	0.179	0.219	0.257	0.327	0.389	0.430									
10.2	0.402	—	0.119	0.184	0.225	0.264	0.337	0.401	0.444									
—	—	—	0.080	0.124	0.151	0.177	0.226	0.269	0.298									
12	—	—	0.140	0.218	0.267	0.315	0.404	0.486	0.542									
—	0.500*	—	0.101	0.158	0.194	0.228	0.294	0.353	0.395									
13.5	0.531	—	0.159	0.248	0.306	0.361	0.465	0.562	0.629	0.692	0.750							
—	—	—	0.107	0.167	0.205	0.242	0.313	0.377	0.423	0.465	0.504							
14	—	—	0.164	0.257	0.316	0.373	0.482	0.583	0.654	0.720	0.782							
—	0.625*	—	0.127	0.200	0.246	0.291	0.378	0.459	0.516	0.570	0.621							
16	—	—	0.188	0.295	0.364	0.431	0.560	0.680	0.765	0.846	0.923							
17.2	0.677	—	0.204	0.321	0.396	0.470	0.610	0.743	0.838	0.928	1.01	1.09						
—	—	—	0.137	0.216	0.266	0.315	0.410	0.499	0.563	0.623	0.681	0.735						
18	—	—	0.213	0.334	0.413	0.490	0.637	0.777	0.877	0.973	1.06	1.15						
—	—	—	0.227	0.357	0.441	0.523	0.682	0.833	0.940	1.04	1.14	1.24						
19	0.750	—	0.152	0.240	0.296	0.352	0.458	0.559	0.632	0.701	0.768	0.831						
—	—	—	0.237	0.373	0.461	0.548	0.715	0.875	0.989	1.10	1.20	1.31	1.43	1.55	1.69	1.82	1.96	2.10
20	—	—	0.255	0.402	0.497	0.591	0.772	0.945	1.07	1.19	1.31	1.42	1.56	1.69	1.83	1.98	2.13	2.30
21.3	0.840	—	0.171	0.270	0.334	0.397	0.519	0.635	0.719	0.799	0.877	0.952	1.05	1.14	1.23	1.31	1.43	1.55

* To be maintained only while inch units are still in use.

NOTE. — The 16 mm and 5/8 in (0.625 in) diameters were previously taken as corresponding values for hot-finished tubes but are not sufficiently close corresponding values for certain applications of precision tubes.

TABLE 2 - Stainless ferritic and martensitic steel tubes (continued)

Outside diameter		Thicknesses																	
		mm	0.5	0.8	1.0	1.2	1.6	2	2.3	2.6	2.9	3.2	3.6	4	4.5	5	5.6	6.3	
		in	0.020	0.032	0.040	0.048	0.064	0.080	0.092	0.104	0.116	0.128	0.144	0.160	0.176	0.192	—	—	
mm	in	Conventional masses per unit length																	
22	—	kg/m	0.261	0.412	0.510	0.606	0.793	0.972	1.10	1.22	1.35	1.46	1.61	1.75	1.91	—	2.06	2.23	2.40
—	0.875*	lb/ft	0.180	0.284	0.351	0.418	0.546	0.669	0.758	0.844	0.926	1.01	1.11	1.20	1.29	1.38	—	1.51	1.64
25	—	kg/m	0.298	0.470	0.583	0.694	0.909	1.12	1.27	1.41	1.56	1.69	1.87	2.04	2.24	—	2.43	2.64	2.86
25.4	1.000	kg/m	0.305	0.481	0.597	0.711	0.931	1.14	1.30	1.45	1.60	1.74	1.92	2.09	2.28	—	2.48	2.69	2.93
—	—	lb/ft	0.205	0.324	0.401	0.477	0.626	0.769	0.873	0.974	1.07	1.17	1.29	1.41	1.53	1.63	—	1.80	1.97
26.9	1.059	kg/m	0.323	0.511	0.634	0.755	0.990	1.22	1.38	1.54	1.70	1.85	2.05	2.24	2.44	—	2.66	2.89	3.16
—	—	lb/ft	0.217	0.343	0.426	0.507	0.665	0.818	0.930	1.04	1.14	1.25	1.38	1.50	1.64	1.75	—	1.94	2.12
28	—	kg/m	0.334	0.529	0.656	0.781	1.03	1.26	1.44	1.60	1.77	1.93	2.13	2.33	2.57	—	2.79	3.05	3.32
30	—	kg/m	0.358	0.567	0.705	0.839	1.10	1.36	1.55	1.73	1.91	2.08	2.31	2.53	2.79	—	3.04	3.32	3.63
31.8	1.250	kg/m	0.383	0.606	0.753	0.898	1.18	1.46	1.66	1.86	2.05	2.24	2.48	2.72	2.97	—	3.26	3.55	3.91
—	—	lb/ft	0.257	0.407	0.506	0.603	0.794	0.979	1.14	1.25	1.38	1.50	1.67	1.83	2.00	2.14	—	2.39	2.63
32	—	kg/m	0.383	0.606	0.753	0.898	1.18	1.46	1.66	1.86	2.05	2.24	2.48	2.72	3.01	—	3.28	3.59	3.93
33.7	1.327	kg/m	0.406	0.644	0.800	0.954	1.26	1.55	1.77	1.98	2.18	2.39	2.65	2.90	3.18	—	3.49	3.81	4.20
—	—	lb/ft	0.273	0.433	0.538	0.641	0.844	1.04	1.19	1.33	1.47	1.60	1.78	1.95	2.14	2.29	—	2.56	2.83
35	—	kg/m	0.419	0.665	0.826	0.985	1.30	1.60	1.83	2.05	2.26	2.47	2.75	3.01	3.33	—	3.64	4.00	4.39
38	1.500	kg/m	0.459	0.729	0.907	1.08	1.43	1.76	2.01	2.25	2.49	2.73	3.03	3.33	3.66	—	4.01	4.40	4.87
—	—	lb/ft	0.309	0.490	0.609	0.727	0.959	1.19	1.35	1.51	1.68	1.83	2.04	2.24	2.46	2.64	—	2.96	3.27
40	—	kg/m	0.480	0.762	0.947	1.13	1.49	1.85	2.11	2.36	2.61	2.86	3.18	3.50	3.88	—	4.25	4.68	5.16
42.4	1.669	kg/m	0.513	0.814	1.01	1.21	1.60	1.98	2.26	2.53	2.80	3.07	3.42	3.76	4.13	—	4.54	4.99	5.54
—	—	lb/ft	0.345	0.547	0.681	0.813	1.07	1.33	1.52	1.70	1.88	2.06	2.30	2.52	2.77	2.98	—	3.35	3.72
44.5	1.750	kg/m	0.538	0.855	1.06	1.27	1.68	2.08	2.37	2.66	2.95	3.23	3.60	3.96	4.35	—	4.80	5.27	5.86
—	—	lb/ft	0.362	0.575	0.715	0.854	1.13	1.40	1.59	1.79	1.98	2.17	2.42	2.66	2.93	3.15	—	3.54	3.94
48.3	1.900	kg/m	0.585	0.929	1.16	1.38	1.83	2.26	2.59	2.91	3.22	3.53	3.93	4.33	4.77	—	5.26	5.77	6.44
—	—	lb/ft	0.393	0.625	0.777	0.929	1.23	1.52	1.74	1.95	2.16	2.37	2.64	2.91	3.20	3.45	—	3.89	4.33
51	2.000	kg/m	—	—	—	1.46	1.93	2.39	2.73	3.07	3.41	3.73	4.16	4.59	5.05	—	5.59	6.14	6.85
—	—	lb/ft	—	—	—	0.981	1.30	1.61	1.84	2.06	2.29	2.51	2.80	3.08	3.40	3.65	—	4.13	4.60

* To be maintained only while inch units are still in use.