
International Standard



1129

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Steel tubes for boilers, superheaters and heat exchangers — Dimensions, tolerances and conventional masses per unit length

Tubes en acier soumis à la flamme pour générateurs de vapeur et tubes en acier pour échangeurs de chaleur — Dimensions, tolérances et masses linéiques conventionnelles

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1129 was developed by Technical Committee ISO/TC 5, *Metal pipes and fittings*, and was circulated to the member bodies in March 1979.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Austria	Israel	South Africa, Rep. of
Belgium	Italy	Spain
Canada	Japan	Sweden
Chile	Korea, Rep. of	Switzerland
Czechoslovakia	Libyan Arab Jamahiriya	Turkey
Denmark	Mexico	United Kingdom
Finland	Netherlands	USSR
France	Norway	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 1129-1977).

Steel tubes for boilers, superheaters and heat exchangers – Dimensions, tolerances and conventional masses per unit length

0 Introduction

The outside diameters and thicknesses have been selected from ISO 4200. The masses per unit length are in accordance with clause 4.

1 Scope and field of application

This International Standard specifies the diameters, thicknesses, tolerances and conventional masses per unit length of fired tubes, including superheater and heat exchanger tubes. This International Standard does not apply for tubes according to ISO 6758 and ISO 6759.

NOTE — This International Standard may not cover all types of heat exchangers.

2 References

ISO 4200, *Plain end steel tubes, welded and seamless — General tables of dimensions and conventional masses per unit length.*¹⁾

ISO 5252, *Steel tubes — Tolerance systems.*

ISO 6758, *Welded steel tubes for heat exchangers.*¹⁾

ISO 6759, *Seamless tubes for heat exchangers.*¹⁾

3 Tolerances

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

3.1 Tolerances on outside diameter

D_2 : ± 1 % with a minimum of $\pm 0,50$ mm

D_3 : $\pm 0,75$ % with a minimum of $\pm 0,30$ mm

D_4 : $\pm 0,50$ % with a minimum of $\pm 0,10$ mm

The tolerances on outside diameter include ovality.

3.2 Tolerances on thickness

T_2 : $\pm 12,5$ % with a minimum of $\pm 0,4$ mm

T_3 : ± 10 % with a minimum of $\pm 0,2$ mm

T_4 : $\pm 7,5$ % with a minimum of $\pm 0,15$ mm

T_5 : ± 5 % with a minimum of $\pm 0,10$ mm

The tolerances on thickness include eccentricity.

3.3 Other tolerances

For tolerances, other than outside diameter and thickness, reference shall be made to ISO 5252.

4 Conventional masses per unit length

The conventional masses per unit length given in table 1 for carbon and alloy steel tubes have been selected from ISO 4200.

The conventional masses per unit length given in table 2 for austenitic stainless steel tubes are the masses of ISO 4200 multiplied by a factor of 1,015. This factor assumes an average density for these tubes of $7,97$ kg/dm³.

The conventional masses per unit length given in table 3 for ferritic and martensitic stainless steel tubes are the masses of ISO 4200 multiplied by a factor of 0,985. This factor assumes an average density for these tubes of $7,73$ kg/dm³.

1) At present at the stage of draft.

Table 1 — Carbon and alloy steel tubes

Outside diameter series mm			Conventional masses per unit length, kg/m, for thicknesses, mm																	
1	2	3	1,2	1,6	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	
10,2			0,266	0,339																
13,5			0,364	0,490	0,567															
	16		0,438	0,568	0,691															
17,2				0,616	0,750	0,845	0,936	1,02	1,10											
	19			0,687	0,838	0,947	1,05	1,15	1,25											
21,3				0,777	0,952	1,08	1,20	1,32	1,43	1,57	1,71									
		25,4		0,939	1,15	1,31	1,46	1,61	1,75	1,94	2,11	2,32	2,52							
26,9				0,998	1,23	1,40	1,56	1,72	1,87	2,07	2,26	2,49	2,70	2,94	3,20					
	31,8			1,19	1,47	1,67	1,87	2,07	2,26	2,50	2,74	3,03	3,30	3,62	3,96	4,32				
33,7				1,27	1,56	1,78	1,99	2,20	2,41	2,67	2,93	3,24	3,54	3,88	4,26	4,66				
	38				1,78	2,02	2,27	2,51	2,75	3,05	3,36	3,72	4,07	4,47	4,93	5,41	5,92			
42,4					1,99	2,27	2,55	2,82	3,09	3,44	3,79	4,21	4,61	5,08	5,61	6,18	6,79	7,29		
		44,5			2,10	2,39	2,69	2,98	3,26	3,63	4,00	4,44	4,87	5,37	5,94	6,55	7,20	7,75	8,51	
48,3					2,28	2,61	2,93	3,25	3,56	3,97	4,37	4,86	5,34	5,70	6,53	7,21	7,95	8,57	9,45	
	51				2,42	2,76	3,10	3,44	3,77	4,21	4,64	5,16	5,67	6,27	6,94	7,69	8,48	9,16	10,1	
						3,10	3,49	3,87	4,25	4,74	5,23	5,83	6,41	7,10	7,88	8,74	9,67	10,5	11,6	
60,3					3,29	3,70	4,14	4,51	5,03	5,55	6,19	6,82	7,55	8,39	9,32	10,3	11,2	12,4		
	63,5				3,47	3,90	4,33	4,76	5,32	5,87	6,55	7,21	8,00	8,89	9,88	10,9	11,9	13,2		
	70					4,32	4,80	5,27	5,90	6,51	7,27	8,01	8,89	9,90	11,0	12,2	13,3	14,8		
76,1						4,71	5,24	5,75	6,44	7,11	7,95	8,77	9,74	10,8	12,1	13,4	14,6	16,3		
		82,5					5,69	6,26	7,00	7,74	8,66	9,56	10,6	11,8	13,2	14,7	16,0	17,9		
88,9								6,76	7,57	8,38	9,37	10,3	11,5	12,8	14,3	16,0	17,4	19,5		
	101,6									8,70	9,63	10,8	11,9	13,3	14,8	16,5	18,5	20,1	22,6	
114,3										9,83	10,9	12,2	13,5	15,0	16,8	18,8	21,0	22,9	25,7	

Table 2 -- Austenitic stainless steel tubes

Outside diameter series mm			Conventional masses per unit length, kg/m, for thicknesses, mm																		
1	2	3	1,0	1,2	1,6	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	
12			0,275	0,325	0,416																
13,5			0,313	0,369	0,477	0,576															
	16	14	0,326	0,385	0,496	0,601															
			0,376	0,445	0,577	0,701															
17,2			0,406	0,481	0,625	0,761															
		18	0,425	0,504	0,657	0,801															
	19		0,451	0,535	0,697	0,851	0,961	1,07													
	20		0,476	0,564	0,737	0,901	1,02	1,14													
21,3			0,509	0,604	0,789	0,966	1,10	1,22	1,34	1,45	1,59	1,74									
		22	0,526	0,625	0,817	1,00	1,14	1,26	1,39	1,50	1,65	1,81									
	25		0,601	0,715	0,937	1,15	1,31	1,46	1,60	1,75	1,93	2,10									
		25,4	0,611	0,727	0,953	1,17	1,33	1,48	1,63	1,78	1,97	2,14									
26,9			0,649	0,772	1,01	1,25	1,42	1,58	1,75	1,90	2,10	2,29									
		30			1,14	1,40	1,59	1,79	1,97	2,14	2,38	2,60									
	31,8				1,21	1,49	1,70	1,90	2,10	2,29	2,54	2,78	3,08	3,35							
		32			1,22	1,50	1,71	1,92	2,11	2,30	2,56	2,80	3,10	3,38							
33,7					1,29	1,58	1,81	2,02	2,23	2,45	2,71	2,97	3,29	3,59							
		35			1,34	1,65	1,88	2,11	2,33	2,55	2,83	3,11	3,43	3,76							
	38				1,46	1,81	2,05	2,30	2,55	2,79	3,10	3,40	3,78	4,13							
		40			1,54	1,90	2,17	2,44	2,69	2,94	3,28	3,60	4,00	4,38							
42,4					1,63	2,02	2,30	2,59	2,86	3,14	3,49	3,85	4,27	4,68							
		44,5			1,72	2,13	2,43	2,73	3,02	3,31	3,68	4,06	4,51	4,94	5,45	6,03					
48,3					1,87	2,31	2,65	2,97	3,30	3,61	4,03	4,44	4,93	5,42	5,99	6,63					
	51				1,98	2,46	2,80	3,15	3,49	3,83	4,27	4,71	5,24	5,76	6,36	7,04	7,81	8,61	9,30	10,3	
		54			2,10	2,60	2,97	3,35	3,70	4,07	4,54	5,00	5,57	6,13	6,78	7,52	8,33	9,22	9,96	11,1	
	57				2,22	2,75	3,15	3,54	3,93	4,31	4,81	5,31	5,92	6,51	7,21	8,00	8,87	9,82	10,7	11,8	
60,3					2,92	3,34	3,76	4,17	4,58	5,11	5,63	6,28	6,92	7,66	8,52	9,46	10,5	11,4	12,6		
	63,5				3,08	3,52	3,96	4,39	4,83	5,40	5,96	6,61	7,38	8,13	9,02	10,0	11,2	12,4	13,5	15,0	
	70				3,40	3,90	4,38	4,87	5,35	5,99	6,61	7,22	8,07	8,90	9,89	11,0	12,3	13,6	14,8	16,5	
76,1					3,70	4,25	4,78	5,32	5,84	6,54	7,28	8,07	8,90	9,89	11,0	12,3	13,6	14,8	16,5		
88,9					4,35	4,98	5,61	6,24	6,86	7,68	8,51	9,51	10,5	11,7	13,0	14,5	16,2	17,7	19,8		
	101,6				4,98	5,71	6,45	7,17	7,89	8,83	9,77	11,0	12,1	13,5	15,0	16,7	18,8	20,4	22,9		
114,3					5,62	6,45	7,27	8,09	8,90	9,98	11,1	12,4	13,7	15,2	17,1	19,1	21,3	23,2	26,1		

Table 3 — Ferritic and martensitic stainless steel tubes

Outside diameter series mm		Conventional masses per unit length, kg/m, for thicknesses, mm																			
1	2	3	1,0	1,2	1,6	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	
12			0,267	0,315	0,404																
13,5			0,303	0,359	0,463	0,558															
	16	14	0,316	0,373	0,482	0,583															
			0,364	0,431	0,559	0,681															
17,2			0,394	0,467	0,607	0,739															
		18	0,413	0,490	0,637	0,777															
	19		0,437	0,519	0,677	0,825	0,933	1,03													
	20		0,462	0,548	0,715	0,875	0,985	1,10													
21,3			0,493	0,586	0,765	0,938	1,06	1,18	1,30	1,41	1,55	1,68									
		22	0,510	0,607	0,793	0,971	1,10	1,22	1,35	1,46	1,61	1,75									
	25		0,583	0,693	0,909	1,11	1,27	1,42	1,56	1,69	1,87	2,04									
		25,4	0,593	0,705	0,925	1,13	1,29	1,44	1,59	1,72	1,91	2,08									
26,9			0,629	0,750	0,983	1,21	1,38	1,54	1,69	1,84	2,04	2,23									
		30			1,10	1,36	1,55	1,73	1,91	2,08	2,30	2,52									
	31,8				1,17	1,45	1,64	1,84	2,04	2,23	2,46	2,70	2,98	3,25							
		32			1,18	1,46	1,65	1,86	2,05	2,24	2,48	2,72	3,00	3,28							
33,7					1,25	1,54	1,75	1,96	2,17	2,37	2,63	2,89	3,19	3,49							
		35			1,30	1,61	1,82	2,05	2,27	2,47	2,75	3,01	3,33	3,64							
	38				1,42	1,75	1,99	2,24	2,47	2,71	3,00	3,30	3,66	4,01							
		40			1,50	1,84	2,11	2,36	2,61	2,86	3,18	3,50	3,88	4,26							
42,4					1,59	1,96	2,24	2,51	2,78	3,04	3,39	3,73	4,15	4,54							
		44,5			1,66	2,07	2,35	2,65	2,94	3,21	3,58	3,94	4,37	4,80	5,29	5,85					
48,3					1,81	2,25	2,57	2,89	3,20	3,51	3,91	4,30	4,79	5,26	5,81	6,43					
	51				1,92	2,38	2,72	3,05	3,39	3,71	4,15	4,57	5,08	5,58	6,18	6,84	7,57	8,35	9,02	9,95	
		54			2,04	2,52	2,89	3,25	3,60	3,95	4,40	4,86	5,41	5,95	6,58	7,30	8,09	8,94	9,66	10,7	
		57			2,16	2,67	3,05	3,44	3,81	4,19	4,67	5,15	5,74	6,31	6,99	7,76	8,61	9,52	10,3	11,4	
60,3					2,84	3,24	3,64	4,05	4,44	4,95	5,47	6,10	6,72	7,44	8,26	9,18	10,1	11,0	12,2		
	63,5				2,98	3,42	3,84	4,27	4,69	5,24	5,78	6,45	7,10	7,89	8,76	9,75	10,8	12,0	13,1	14,6	
	70				3,30	3,78	4,26	4,73	5,19	5,81	6,41	7,16	7,83	8,64	9,59	10,6	11,9	13,2	14,4	16,1	
76,1					3,60	4,13	4,64	5,16	5,66	6,34	7,00	7,83	8,64	9,59	10,6	12,6	14,1	15,8	17,1	19,2	
88,9					4,23	4,84	5,45	6,06	6,66	7,46	8,25	9,23	10,1	11,3	12,6	14,6	16,3	18,2	20,7	22,3	
	101,6				4,84	5,55	6,25	6,95	7,65	8,57	9,49	10,6	11,7	13,1	14,8	16,5	18,5	20,7	22,6	25,3	
114,3					5,46	6,25	7,05	7,85	8,64	9,68	10,7	12,0	13,3	14,8	16,5	18,5	20,7	22,6	25,3		