International Standard 6758

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

Welded steel tubes for heat exchangers

Tubes soudés en acier pour échangeurs de chaleur

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Descriptors : heat exchangers, steel tubes, smooth tubes, welded tubes, alloy steels, unalloyed steels, dimensions, mass, dimensional tolerances.

Price based on 3 pages

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 6758 was developed by Technical Committee ISO/TC 5, *Metal pipes and fittings*, and was circulated to the member bodies in July 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	Korea, Rep. of	Sweden
Chile	Mexico	Switzerland
Czechoslovakia	Netherlands	United Kingdom
Denmark	New Zealand	USSR
Finland	Norway	
France	Poland	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Japan
USA

Printed in Switzerland

Welded steel tubes for heat exchangers

1 Scope and field of application

1.1 This International Standard specifies the characteristics of plain end welded tubes manufactured from unalloyed and alloyed steels (including austenitic stainless steels) which are intended for use in the construction of heat exchangers.

1.2 This International Standard does not cover steel tubes intended for exposure to flame.

2 References

ISO 2604/3, *Steel products for pressure purposes — Quality requirements — Part 3 : Electric resistance and induction — Welded tubes.*

ISO 2604/5, *Steel products for pressure purposes — Quality requirements — Part 5 : Longitudinally welded austenitic stainless steel tubes.*

3 Material

Tubes shall be to the requirements of ISO 2604/3 or ISO 2604/5. They shall be to test category III or V for ISO 2604/3 and to test category II or IV for ISO 2604/5, except that the hydraulic test may, at the option of the manufacturer, be replaced by a non-destructive test which ensures equivalent leak tightness.

The steels shall preferably be selected from the following :

Unalloyed : TW2, TW5, TW9H, TW10

Alloyed : TW26, TW32

Austenitic stainless : TW46, TW47, TW53, TW57, TW58, TW60, TW61

Other grades of steel from ISO 2604, Parts 3 and 5, may be supplied by agreement between the manufacturer and the purchaser.

4 Dimensions, masses and tolerances

4.1 Dimensions and masses

Table 1 — Unalloyed and alloyed steels

Outside diameters mm	Thicknesses, mm				
	1,2	1,6	2,0	2,6	3,2
	Masses per unit length, kg/m				
16	0,438	0,568	0,691	—	—
20	—	0,726	0,888	1,12	—
25	—	0,923	1,13	1,44	1,72
30	—	1,12	1,38	1,76	2,11
38	—	—	1,78	2,27	2,75

NOTE — See also the annex.

Table 2 — Austenitic stainless steels

Outside diameters mm	Thicknesses, mm				
	1,2	1,6	2,0	2,6	3,2
	Masses per unit length, kg/m				
16	0,445	0,577	0,701	—	—
20	0,564	0,737	0,901	1,14	—
25	—	0,937	1,15	1,46	1,75
30	—	1,14	1,40	1,79	2,14
38	—	1,46	1,81	2,30	2,79

NOTE — See also the annex.

4.2 Tolerances

The tubes shall be subject to the tolerances given below. The tolerances on outside diameter include ovality and those on thickness include eccentricity.

4.2.1 Outside diameter

4.2.1.1 Unalloyed and alloyed steel tubes

Diameter	Tolerance
Up to and including 20 mm	± 0,10 mm
Over 20 up to and including 38 mm	± 0,15 mm

4.2.1.2 Austenitic stainless steel tubes

Class 1 :

Diameter	Tolerance
Up to and including 20 mm	± 0,15 mm
Over 20 up to and including 38 mm	± 0,20 mm

Class 2 :

Diameter	Tolerance
Up to and including 30 mm	± 0,3 mm
Over 30 up to and including 38 mm	± 0,4 mm

4.2.2 Thickness

The tolerance on thickness, excluding the weld, shall be ± 10 % (minimum ± 0,2 mm) except where, by agreement, tubes are supplied to a minimum thickness when the following tolerance shall apply :

$$^{+\ 20}_{\ 0}\ \%$$

The external weld upset shall be removed completely, i.e. flush with the outside surface of the tube and the internal weld upset shall be removed so that the height does not exceed :

0,25 mm for tubes with outside diameter of < 20 mm

0,15 mm for tubes with outside diameter of ⩾ 20 mm

NOTE — The thicknesses and masses per unit length in tables 1 and 2 are expressed in mean values. When minimum thicknesses are specified, the masses are required to be increased by 10 %.

4.2.3 Length

Where length is specified "exact" or "cut length", the tolerance on length shall be :

Length	Tolerances
Up to and including 6 000 mm	$^{+\ 3,0}_{\ 0}$ mm
Over 6 000 mm up to and including 9 000 mm	$^{+\ 4,5}_{\ 0}$ mm
Over 9 000 mm up to and including 12 000 mm	$^{+\ 6,0}_{\ 0}$ mm
Over 12 000 mm up to and including 15 000 mm	$^{+\ 7,5}_{\ 0}$ mm
Over 15 000 mm up to and including 18 000 mm	$^{+\ 9,0}_{\ 0}$ mm

5 Designation for ordering

5.1 The tubes specified in this International Standard shall be designated by the following data :

a) the denomination "tube";

b) reference to this International Standard;

c) dimensions in millimetres (outside diameter and thickness);

d) steel type.

Example :

Tube complying with ISO 6758, having an outside diameter of 20 mm and a thickness of 2 mm, made of steel TW 5 will be designated by :

Tube ISO 6758 — 20 × 2 — TW 5

5.2 This International Standard provides for some alternatives. The purchaser shall state in the order the requirements referring thereto; if no indication is given, delivery will be according to manufacturer's choice.

Annex

Metric dimensions corresponding to inch dimensions

It is recognized that the dimensions in the table below may be required when re-tubing existing heat exchangers to satisfy the critical tube to tube-sheet clearances, particularly when the latter were originally produced in inch sizes.

These dimensions are interchangeable with corresponding inch dimensions. The conditions of delivery (in particular tolerances on thicknesses) shall be subject to agreement between manufacturer and purchaser.

Outside diameters mm	**Thicknesses,** mm					
	0,89	1,25	1,65	2,11	2,77	3,41
15,9	× [1)]	×	×	×		
19,05	× [1)]	× [1)]	×	×	×	
25,4		× [1)]	×	×	×	×
31,8			×	×	×	×
38,1			×	×	×	×
50,8				×	×	×

1) Only for stainless steel tubes.

NOTE — The masses are to be calculated in accordance with ISO 4200.

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