

Medium-weight threaded steel tubes

DIN
2440

Stahlrohre; mittelschwere Gewinderohre

As it is current practice in standards published by the International Organization for Standardization (ISO), the comma has been used throughout as a decimal marker.

As regards the nominal sizes and tube dimensions quoted, this standard corresponds to ISO 65 — 1973 published by the International Organization for Standardization (ISO), see Explanatory notes.

1 Field of application

Dimensions in mm

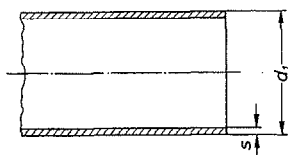
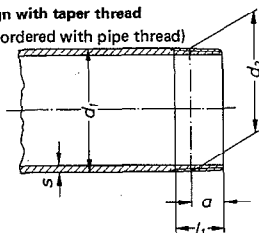
This standard applies to threaded medium-weight tubes. They are suitable for nominal pressure 25 for liquids and nominal pressure 10 for air and non-hazardous gases.

2 Other standards to be observed

DIN 2444	Zinc coatings on steel tubes; quality standard for the hot galvanizing of steel tubes for installation purposes
DIN 2999 Part 1	Whitworth pipe threads for tubes and fittings; cylindrical internal thread and conical external thread; thread dimensions
DIN 17 100	Steels for general structural purposes; quality specifications
DIN 50 136	Testing of metallic materials; flattening test on tubes

3 Dimensions, designation

Standard design

Pipe design with taper thread
(for tube ordered with pipe thread)

Designation of a seamless medium-weight threaded tube, nominal size 40, galvanized (B), in manufacturing lengths:

Threaded tube DIN 2440 — DN 40 — seamless B

Table 1.

Nominal size DN	Connecting nominal size of the fittings conforming to DIN 2950 and DIN 2980	Whitworth pipe threads as in DIN 2999 Part 1	Tube				Pipe thread						Corresponding socket conforming to DIN 2986	
			Outside diameter d_1	Wall thickness s	Mass		Theoretical pipe thread diameter d_2	Number of threads in 25,4 mm	Useful pipe thread length l_1 min. at a max.	Distance of pipe thread diameter d_2 from tube end		Outside diameter	Length	
					of plain-end tube kg/m	of socketed tube kg/m				a max.	a min.			
6	1/8	R 1/8	10,2	2,0	0,407	0,410	9,728	28	7,4	4,9	3,1	14	17	
8	1/4	R 1/4	13,5	2,35	0,650	0,654	13,157	19	11,0	7,3	4,7	18,5	25	
10	3/8	R 3/8	17,2	2,35	0,852	0,858	16,662	19	11,4	7,7	5,1	21,3	26	
15	1/2	R 1/2	21,3	2,65	1,22	1,23	20,955	14	15,0	10,0	6,4	26,4	34	
20	3/4	R 3/4	26,9	2,65	1,58	1,59	26,441	14	16,3	11,3	7,7	31,8	36	
25	1	R 1	33,7	3,25	2,44	2,46	33,249	11	19,1	12,7	8,1	39,5	43	
32	1 1/4	R 1 1/4	42,4	3,25	3,14	3,17	41,910	11	21,4	15,0	10,4	48,3	48	
40	1 1/2	R 1 1/2	48,3	3,25	3,61	3,65	47,803	11	21,4	15,0	10,4	54,5	48	
50	2	R 2	60,3	3,65	5,10	5,17	59,614	11	25,7	18,2	13,6	66,3	56	
65	2 1/2	R 2 1/2	76,1	3,65	6,51	6,63	75,184	11	30,2	21,0	14,0	82	66	
80	3	R 3	88,9	4,05	8,47	8,64	87,884	11	33,3	24,1	17,1	95	71	
100	4	R 4	114,3	4,5	12,1	12,4	113,030	11	39,3	28,9	21,9	122	83	
125	5	R 5	139,7	4,85	16,2	16,7	138,430	11	43,6	32,1	25,1	147	92	
150	6	R 6	165,1	4,85	19,2	19,8	163,830	11	43,6	32,1	25,1	174	92	

1) Related to an average length of 6 m.

¹⁾ Related to an average length of 6 m.

A decision with regard to the method of designation for fittings will be taken at the time when the currently existing ISO Recommendations are converted to ISO Standards, due consideration being given to international practice regarding the designation of threaded tubes.

Continued on pages 2 and 3
Explanatory notes on page 4

4 Pipe thread

Whitworth pipe thread conforming to DIN 2999 Part 1, taper 1 : 16.

5 Material

St 33-2 conforming to DIN 17 100, material number 1.0035.

In general, tubes conforming to this standard shall be suitable for fusion welding.

Neither the crystalline condition nor any variation in hardness occurring over the circumference and brought about by the manufacturing process may impair the proper threading of the tubes.

6 Design

Seamless or welded.

7 Tubes at delivery

In manufacturing lengths without pipe thread and without socket. If another form of supply is desired, the designation shall be supplemented as follows:

for supply with taper thread at both ends: "with pipe thread";

for supply with taper thread at both ends and one socket screwed on: "with socket".

Example of designation for the tube with taper thread at both ends referred to in clause 3:

Threaded tube DIN 2440 — DN 40 — seamless B, with pipe thread.

8 Finish

According to the order the finish of the tubes supplied shall be as follows:

Table 2.

Surface	Symbol
Black	—
Black, suitable for galvanizing in accordance with subclause 10.3	A
Galvanized as specified in DIN 2444	B
Non-metallic protective coating ²⁾	C
	D
²⁾ Subject to agreement.	

The types of finish can also be combined.

For example:

"Non-metallic protective coating on galvanized tube (BC)"

If nothing is stated, the tubes will be supplied "black".

9 Marking

Welded threaded tubes in nominal sizes 10 to 150 are to be marked at approximately 1 m intervals with the manufacturer's trademark in a durable and readily recognizable manner.

Threaded seamless tubes are to be marked on one end of the tube with the manufacturer's trademark in a durable and readily recognizable manner.

10 Technical delivery conditions

10.1 Pipe threads

The pipe threads shall correspond to DIN 2999 Part 1, the pipe thread diameter d_2 being referred to as the diameter measured at distance a from the tube end over the crests of the pipe thread. The last threads at the tube end may be incomplete.

10.2 Surface

The tubes shall have a smooth outside and inside surface consistent with the kind of manufacture. Slivers, scabs, foliations and the like have to be removed. This however shall not cause the wall thickness to go below the permissible deviation.

10.2.1 In the case of welded tubes, the weld shall show full penetration and be devoid of any major nonmetallic inclusions and other defects. On the inside there shall be no evidence of droplets of weld metal having penetrated. The height of the welding burr on the inside shall not exceed 60 % of the nominal wall thickness.

The external welding burr (upset bead) shall in all cases be removed from tubes electrically welded with pressure.

10.3 Suitability for galvanizing

(Symbol for ordering purposes: A)

Over and above the requirements with regard to the finish as specified in subclause 10.2, the reinforcement of the inner welding burr shall not exceed 0,3 mm + 0,05 · s in the case of welded tubes which are suitable for galvanizing in accordance with DIN 2444.

The welding burr shall not be fissured.

10.4 Lengths

The tubes are normally supplied in manufacturing lengths.

10.4.1 The usual manufacturing lengths for welded tubes shall be:

$$6 \text{ m} \pm 100 \text{ mm}$$

According to occurrence, up to 6 % of the quantity delivered can be supplied in lengths between 5 m and 5,95 m, separately bundled.

10.4.2 The usual manufacturing lengths for seamless tubes shall be:

$$6 \text{ m} \pm 1 \text{ m}$$

According to occurrence, up to 10 % of the quantity delivered can be supplied in lengths of more than 4 m to below 5 m or of more than 7 m to below 8 m, separately bundled in each case.

10.4.3 Supply of the tubes in other types of length is to be agreed separately, e.g. exact lengths.

The length to be specified when ordering will be complied with to within a deviation of $\pm 15 \text{ mm}$.

Detail of order: Exact length.....m

Example:

Threaded tube DIN 2440 — DN 40 — seamless B, with pipe thread, exact length 7 m.

10.5 Permissible dimensional deviations

Table 3.

Nominal size DN	d_1 max.	d_1 min.
6	10,6	9,8
8	14,0	13,2
10	17,5	16,7
15	21,8	21,0
20	27,3	26,5
25	34,2	33,3
32	42,9	42,0
40	48,8	47,9
50	60,8	59,7
65	76,6	75,3
80	89,5	88,0
100	115,0	113,1
125	140,8	138,5
150	166,5	163,9

Wall thickness

— 12,5 % (— 15 % at individual points not longer than twice the outside diameter, provided that this reduction is effective only on the outer surface).

The upper limit is fixed by the permissible deviation in mass.

10.6 Deviation in mass

Compared with the masses specified in the table on page 1 deviations according to the following table are permitted.

Table 4.

For a single tube	For a consignment of not less than 10 t
± 10 %	± 7,5 %

10.7 Straightness

The tubes have to appear straight to the eye.

10.8 Cold bending capability

Tubes suitable for screwing conforming to this standard, without surface treatment, shall be capable of being bent cold by means of a suitable commercial bending tool to a radius of 3 times tube outside diameter up to and including nominal size DN 25, and to a radius of 3,5 times tube outside diameter in the case of tubes up to nominal size DN 50 (see subclause 11.4).

11 Testing

11.1 Material

As regards the testing of the mechanical properties of the material DIN 17 100 shall apply.

No acceptance by an expert takes place nor is a works certificate based on materials tests being issued.

11.2 Leak testing

All tubes are to be tested in the manufacturer's works for leak tightness. If this testing is effected by internal hydraulic pressure, the test pressure used shall be 50 bar. Instead of the internal hydraulic pressure test, the manufacturer may also carry out another test, e.g. an eddy current test³⁾ verified as ensuring equivalent quality. If so specified in the order, the manufacturer shall issue a certificate of compliance with the order in respect of the test performed for leak tightness.

The test for leak tightness is to be carried out only on the unmachined tube and not on the joint.

Tubes which fail the leak test are to be eliminated.

11.3 Flattening test

As a technological test on pressure welded tubes, the flattening test as described in DIN 50 136 shall be carried out on random samples for quality control of the welding. In the flattening test the specimens or tube ends are to be compressed until the distance between the two pressure platens reaches 2/3 of the original outside diameter of the tube without this causing the weld to open. The weld shall lie alternately in the vertical plane (12 o'clock position) and in the horizontal plane (3 o'clock position).

11.4 Bend test

On tubes up to and including DN 50 the bend test shall be carried out on random samples as a technological test for verifying the cold bending capability.

In the bend test a suitable commercial type bending tool shall be used to bend the tube at a radius of 3,0 or 3,5 times tube outside diameter to make a 90° bend. This shall not cause any cracking.

In the case of welded tubes the weld shall not exhibit any incipient cracking. The weld shall lie alternately in the vertical plane (12 o'clock position) and in the horizontal plane (3 o'clock position).

12 Complaints

External and internal defects other than those stated in the standard may only be objected to if they impair the proper processing and/or utilization of the tubes in an appropriate manner.

The customer shall give the supplier an opportunity of satisfying himself that the complaint is justified, and if possible, shall do this by submitting the material objected to as well as specimens of the material as supplied.

³⁾ According to *Stahl-Eisen-Prüfblatt* (Iron-Steel Test Sheet) 1925, obtainable from *Verlag Stahl-Eisen*, Postfach 8229, D-4000 Düsseldorf 1.

Explanatory notes

The revision of the standards dealing with threaded tubes, the dimensional specifications of which are fully in agreement with International Standard ISO 65—1973, had become necessary because recent findings had revealed more far-reaching quality requirements to be indispensable.

Corrosion damage on threaded welded tubes has shown that for galvanized tubes reduction of the internal welding burr is to take place if the requirements specified in subclause 10.3 have not been complied with.

The tubes may be ordered with or without pipe thread and with or without socket. This takes account of the usual practical applications in which the tubes are mostly cut to shorter lengths and a taper thread conforming to DIN 2999 Part 1 is then cut on each of these tube ends.

The ordering symbols for black tubes:

- black;
- black, suitable for galvanizing (A);

have been included for the first time.

The marking of welded tubes with the manufacturer's trademark has been extended to cover the range DN 10 to 150. Seamless threaded tubes are to be marked durably with the manufacturer's trademark on one end of the tube.

Finally, in order to ensure proper workability of the tubes, random sample checking of the welded tubes by means of the flattening test, and of seamless and welded tubes up to DN 50 by means of the bend test has been included.