

Welded cold drawn precision steel tubes

Heléns stock welded cold drawn and specially welded tubes in normalized or cold drawn / hard delivery qualities. The heat treated tubes are used in constructions where there is a demand on formability. In parts where the machinability is the most important thing the cold draw / hard tubes are used. The special tubes is also stocked in zinc coated condition and are then used in applications where corrosion resistance is important.

WELDED COLD DRAWN PRECISION STEEL TUBES

Produced according to EN 10305-2. The tubes are inside and outside cold drawn, and are stocked in cold drawn (+C) condition in quality E235, in lengths of 5-7 meter. Thanks to the advanced production technique the tubes have a very good eccentricity and tight tolerances.

PRODUCT INFORMATION

OD	WALL	KG/M
12.00	1.75	0.442
13.00	2.00	0.540
14.00	1.75	0.528
15.00	2.00	0.640
16.00	1.50	0.540
16.00	2.00	0.690
16.00	2.50	0.830
18.00	2.00	0.790
18.00	2.50	0.960
18.00	3.00	1.110
19.00	1.50	0.647
20.00	2.50	1.079
20.00	4.00	1.580
22.00	4.00	1.780
24.00	3.50	1.769
25.00	2.50	1.390
25.00	3.00	1.630
25.00	4.00	2.070
25.00	5.00	2.470
28.00	1.50	0.980
28.00	4.00	2.368
30.00	3.00	2.000

OD	WALL	KG/M
30.00	4.00	2.565
30.00	5.00	3.080
32.00	3.00	2.150
32.00	3.50	2.460
34.00	1.50	1.200
34.00	2.00	1.580
35.00	3.50	2.720
35.00	4.00	3.060
42.00	4.00	3.749
45.00	4.00	4.040
50.00	1.50	1.790
50.00	3.00	3.480
50.00	4.00	4.540
50.00	5.00	5.550
50.00	6.00	6.510
55.00	4.00	5.030
55.00	5.00	6.165
55.00	6.00	7.250
56.00	3.00	3.920
60.00	2.50	3.550
60.00	4.00	5.520
60.00	5.00	6.780

HEAT TREATET WELDED COLD DRAWN PRECISION STEEL TUBES

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PRODUCT INFORMATION

OD	WALL	KG/M
22.00	1.50	0.758
28.00	1.50	0.980
30.00	1.00	0.720
32.00	1.50	1.130

OD	WALL	KG/M
38.00	3.00	2.590
48.00	2.50	2.805
50.00	2.00	2.368
62.00	2.00	2.959

SURFACE

In accordance with the manufacturing method, the tubes shall have a smooth outer and inner surface. Due to the manufacturing method surface defects such as depressions, pores and longitudinal scratches are permitted.

SURFACE TREATMENT

The tubes can be delivered surface treated according to EN 10305-4.

STRAIGHTNESS | EN 10305-1, EN 10305-2, MECHANICAL TUBS

For tubes with $OD > 15 \leq 260$ mm and minimum length of 1000 mm, the deviation from straightness shall not exceed:

$$0.0015 \times L \quad \text{for } R_e H \leq 500 \text{ Mpa}$$

$$0.0020 \times L \quad \text{for } R_e H > 500 \text{ Mpa}$$

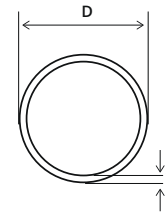
In both cases, the deviation from straightness over 1000 mm length shall not exceed 3 mm.

STRAIGHTNESS | EN 10305-4

For tubes with $OD > 15$ mm and minimum length of 1000 mm, the deviation from straightness shall not exceed $0,0015 \times L$. For tubes greater than 1000 mm, the deviation straightness shall not exceed 3 mm. Tubes with outside diameter up to an including <15 mm are delivered straightened in the best possible way. According to EN 10305-1, -2, -4.

TOLERANCES

For heat treated tubes according to EN 10305-1 and EN 10305-2, OD tolerance according to table is applicable.



OD	TOLERANCE +/- (MM)
4 - 30	0.08
32 - 40	0.15
42 - 50	0.2
55 - 60	0.25
65 - 70	0.3
75 - 80	0.35
85 - 90	0.4
95 - 100	0.45
110 - 120	0.5
130 - 140	0.7
150 - 160	0.8
170 - 180	0.9
190 - 200	1

T / D (FIGURE 1)	VALUES ACCORDING TO THE MEASUREMENT TABLE
≥ 0.05	1 x the value in the measurement table
$0.05 > T/D \geq 0.025$	1.5 x the value in the measurement table
< 0.025	2 x the value in the measurement table

WALL TOLERANCE	
+/- 10 % or at least +/- 0.1 mm	10305-1 / - 4
+/- 7.5 % or at least +/- 0.1 mm	10305-2

TUBE ENDS

Tubes are cut wherever possible perpendicular to tube axis. However, diametrical changes as well as local wall thickness deformation can occur when cutting. This does not apply to fixed lengths. Special machining of ends can be arranged after agreement.

ORDERED QUANTITY (M)	PERMITTED DEVIATION %
≤ 500	+/- 15
> 500	+/- 10

TOLERANCE OF DELIVERED QUANTITIES

Delivery of quantities less than or exceeding the ordered quantity is dependant on the ordered number of meters per dimension and is permitted according to the table alongside. With fixed lengths, delivery of quantities less than ordered is not allowed. Delivery of quantities greater than ordered is allowed according to the table alongside.

ORDERED QUANTITY (PIECES)	PERMITTED DEVIATION %
≤ 500	20
$> 500 \leq 2000$	15
> 2000	10

DELIVERY CONDITION

DESIGNATION	EN 10305-1, -2, -4	EXPLANATION
Cold drawn / hard	+C	No heat treatment after last cold drawing process. The tubes therefore only have low formability.
Stress-relieved annealed	+SR	After the final cold drawing process the tubes are heat treated. The reduction of inherent stress allows the tube, with proper subsequent processing, to be swarfless formed or machined within certain limits.
Normalised	+N	The tubes are annealed above the upper transformation point in a controlled atmosphere or under vacuum.

MATERIAL IN ACCORDANCE WITH EN 10305

STEEL QUALITY	NORM	TYPE	DELIVERY CONDITION	CHEMICAL COMPOSITION					MECHANICAL PROPERTIES		
				C MAX%	SI MAX%	MN MAX%	P MAX%	S MAX%	YIELD STRENGTH R _{eh} MPa	TENSILE STRENGTH R _m MPa	EXTENSION A ₅ MIN%
E195	EN 10305-2	Welded	+C	0.15	0.35	0.7	0.025	0.025	-	420	6
		Cold drawn	+N	0.15	0.35	0.7	0.025	0.025	195	300-440	28
E235	EN 10305-1	Seamless	+C	0.17	0.35	1.2	0.025	0.025	-	480	6
			+N	0.17	0.35	1.2	0.025	0.025	235	340-480	25
E235	EN 10305-2	Welded	+C	0.17	0.35	1.2	0.025	0.025	-	490	6
		Cold drawn	+N	0.17	0.35	1.2	0.025	0.025	235	340-480	25
E235	EN 10305-4	Seamless	+N	0.17	0.35	1.2	0.025	0.015	235	340-480	25
E355	EN 10305-1	Seamless	+N	0.22	0.55	1.6	0.025	0.025	355	490-630	22
			+C	0.22	0.55	1.6	0.025	0.025	355	490-630	22
E355	EN 10305-2	Cold drawn	+N	0.22	0.55	1.6	0.025	0.025	355	490-630	22
		Cold drawn	+N	0.22	0.55	1.6	0.025	0.025	355	490-630	22
E355	EN 10305-4	Seamless	+N	0.22	0.55	1.6	0.025	0.015	355	490-630	22

SPECIAL WELDED STEEL TUBES

Special 07 – Special welded precision tubes, in material E195 and normalized conditions, are suitable for fluid transfer applications, for instance oil pipes and water inlet pipes. Outside diameter tolerances according to EN 10305-2, wall thickness tolerances according to EN 10305-3. Inside welding seam max 0.3 mm. OD 5 - 12 mm are leak tested with helium at 35 bar pressure. OD > 12 mm are eddy current tested. The material is cold rolled and delivered from stock in lengths of normally 6000 mm.

PRODUCT INFORMATION

OD	WALL	KG/M
5.00	1.00	0.099
8.00	1.00	0.173
10.00	1.00	0.222
12.00	1.00	0.271
12.00	1.50	0.388
15.00	1.50	0.499
16.00	1.00	0.370
16.00	1.50	0.538

OD	WALL	KG/M
18.00	1.00	0.419
19.00	1.00	0.444
20.00	1.50	0.684
22.00	1.00	0.518
22.00	1.50	0.758
25.00	1.50	0.869
28.00	1.50	0.980
32.00	1.50	1.128

QUALITY	TYPE	DELIVERY CONDITION	CHEMICAL COMPOSITION					MECHANICAL PROPERTIES		
			C MAX%	SI MAX%	MN MAX%	P MAX%	S MAX%	YIELD STRENGTH R _{eh} MPa	TENSILE STRENGTH R _m MPa	EXTENSION A ₅ MIN%
E195	Welded	BK	0.15	0.30	0.60	0.025	0.025	-	min 460	6
		NBK	0.15	0.30	0.60	0.025	0.025	205	310-410	28