Welded precision steel tubes

Heléns' welded precision steel tubes has properties that give the tube excellent formability, weldability, strength, measurement accuracy, surface quality and coatability. Together, these properties give great freedom in dimensioning and design, and thus the possibility to create styleful assemblies and constructions.

ROUND WELDED PRECISION STEEL TUBES

Round welded precision steel tubes according to EN 10305-3. The tubes are made from cold rolled strip; E220 + CR2, S3 or pickled hot rolled strip; E220 + CR2, S2. They are stocked in fabrication lengths of 6100 mm and are lightly oiled.

PRODUCT INFORMATION

OD	WALL	KG/M	S2	S3
8.00	1.00	0.173		×
9.50	1.00	0.210		×
10.00	1.00	0.222		×
10.00	1.50	0.314		×
10.00	2.00	0.394		×
12.00	1.00	0.271		×
12.00	1.50	0.388		×
12.70	1.00	0.289		×
12.70	1.25	0.353		×
12.70	1.50	0.414		×
13.00	1.50	0.425		×
14.00	1.00	0.321		×
14.00	1.50	0.462		×
14.00	2.00	0.592		×
15.00	1.00	0.345		×
15.00	1.50	0.499		×
15.00	2.00	0.640		×
16.00	1.00	0.370		×
16.00	1.50	0.536		×
16.00	2.00	0.691		×
18.00	1.00	0.419		×
18.00	1.50	0.610		×
18.00	2.00	0.789		×
19.00	1.00	0.444		×

OD	WALL	KG/M	S2	S3
19.00	1.25	0.547		×
19.00	1.50	0.647		×
19.00	2.00	0.838		×
20.00	1.00	0.469		×
20.00	1.25	0.578		×
20.00	1.50	0.684		×
20.00	2.00	0.888		×
20.00	2.50	1.080		×
20.00	3.00	1.258		×
21.00	1.50	0.721		×
22.00	1.00	0.518		×
22.00	1.25	0.640		×
22.00	1.50	0.758		×
22.00	2.00	0.986		×
22.00	2.50	1.200		×
22.00	3.00	1.405		×
25.00	1.00	0.592		×
25.00	1.25	0.732		×
25.00	1.50	0.869		×
25.00	2.00	1.130	×	×
25.00	2.50	1.390		×
25.00	3.00	1.628		×
25.40	1.25	0.744		×
25.40	1.50	0.884		×

OD	WALL	KG/M	S2	S3
27.00	2.00	1.230	×	
28.00	1.00	0.666		×
28.00	1.25	0.825		×
28.00	1.50	0.980		×
28.00	2.00	1.280		×
28.00	2.50	1.570		×
28.60	1.50	1.000		×
30.00	2.00	1.381		×
30.00	2.50	1.700		×
30.00	1.50	1.381		×
30.00	3.00	2.000		×
32.00	1.50	1.130		×
32.00	2.00	1.480		×
32.00	2.50	1.820		×
32.00	3.00	2.145	×	
35.00	1.00	0.838		×
35.00	1.50	1.240		×
35.00	2.00	1.630	×	
35.00	2.50	2.000	×	
35.00	3.00	2.368		×
38.00	1.00	0.912		×
38.00	1.50	1.350		×
38.00	2.00	1.780		×
38.00	2.50	2.190		×
38.00	3.00	2.589		×
40.00	1.50	1.420		×
40.00	2.00	1.870		×
40.00	2.50	2.310	×	
40.00	3.00	2.737		×
42.00	2.00	1.970		×
44.50	1.50	1.590		×
44.50	2.00	1.720		×
44.50	2.50	2.590	×	
45.00	1.50	1.610	×	
45.00	2.00	2.120	×	
45.00	3.00	3.107		×

OD	WALL	KG/M	S2	S3
48.00	1.50	1.720		×
48.00	2.00	2.270		×
48.00	2.00	2.270		×
48.00	3.00	3.329		×
50.00	1.50	1.790		×
50.00	2.00	2.370	×	
50.80	1.25	1.530		×
50.80	1.50	1.820		×
50.80	2.00	2.410	×	
50.80	2.50	2.980	×	
50.80	3.00	3.536	×	
54.00	1.50	1.940	×	
54.00	2.00	2.570	×	
57.00	1.50	2.050		×
57.00	2.00	2.710		×
60.00	1.50	2.160		×
60.00	2.00	2.860		×
60.00	2.50	3.550		×
60.00	3.00	4.220	×	
63.50	1.50	2.290		×
63.50	2.00	3.030	×	
70.00	1.50	2.534	×	
70.00	2.00	3.354	×	
76.00	1.50	2.756		×
76.00	2.00	3.660		×
80.00	1.50	2.900	×	
80.00	2.00	3.847	×	
89.00	1.50	3.240		×
89.00	2.00	4.290		×
102.00	1.50	3.717		×
102.00	2.00	4.933		×
108.00	2.00	5.228		×
114.00	1.50	4.172		×
114.00	2.00	5.520		×
127.00	2.00	6.165		×
133.00	2.00	6.460		×

FLAT OVAL WELDED PRECISION STEEL TUBES

According to EN 10305-3. Our stock is manufactured from tubes made from cold rolled strip; E220, S3 + CR2 or pickled hot rolled strip; E220, S2 +CR2. The tube is stocked in fabrication lengths of 6100 mm and is lightly oiled.

PRODUCT INFORMATION

OD1	OD2	WALL	KGM	S2	S3
36.00	16.00	1.50	1.050		×
38.00	20.00	1.50	1.108		×
40.00	20.00	1.50	1.160		×
40.00	20.00	2.00	1.520		×

OD1	OD2	WALL	KGM	S2	S3
45.00	17.00	1.50	1.233		×
50.00	20.00	2.00	1.830		×
60.00	30.00	2.00	2.320	×	

DELIVERY CONDITION

	DESIGNATION	ACCORDING TO EN 10305-3	DESCRIPTION
Welded and cold sized	+ CR1	BKM	Not normally heat treated, but intended for final annealing
Welded and cold sized	+ CR2	BKM	Not intended for heat treatment
Annealed	+ A	GBK	Annealed in a controlled atmosphere
Normalised	+ N	NBK	Normalised in a controlled atmosphere

We mainly stock tubes in accordance with +CR2.

Tube in accordance with +CR 1 may be available in certain dimensions in the outer areas.

Tube in accordance with +A and +N can be offered on request.

SURFACE CHARACTERISTIC

The tube has, with regard to the manufacturing method, a high surface fineness. Small surface faults, such as ridges and depressions, scratches, etc. due to the manufacturing method, can occur.

	DESIGNATION	SURFACE FINENESS RA VALUE*	USE
Unpickled hot strip	S1	-	
Pickled hot strip	S2	2.0 my	Painting, electro-galvanizing, suitable for hot galvanizing
Cold rolled strip	S3	0.6 my	Painting and electro-galvanizing.
Surface treated strip	S4	-	For demanding corrosion conditions

*The Ra values given in the table do not apply to the weld seam area.

GALVANIZED TUBE

DESIGNATION	SURFACE PATTERN	ZINC COATING MASS	ZINC COATING THICKNESS
Z275	M	275g/m^2	20 my

Galvanized tubes can be delivered in other thicknesses depending on your needs, 100-350 g/m2.

MECHANICAL CHARACTERISTICS

MATERIAL	DELIVERY CONDITION	ReHMPa	RmMPa	A5 %
E220*	+CR2	220	310	23
E235	+CR1	-	390	7
E370	+CR2	370	450	15
E355	+CR1	-	540	5

The mechanical values apply to completed tubes. The designation of the steel gives the nominal yield strength for complet tube.

* Standard material

TOLERANCES

For tube of type +CR1 and +CR2, the diametrical deviation in the table below applies. Permitted diametrical deviation includes any ovality.

Heléns comment: For heat treated tube, e.g. annealed (+A) or normalised (+N), the diametrical tolerance dependant on the dimension can be larger.

NOMINAL SIZE (MM)	PERMITTED DEVIATION (MM)
6-19	+/- 0.12
20-30	+/- 0.15
32-42.4	+/- 0.20
44-51	+/- 0.25

NOMINAL SIZE (MM)	PERMITTED DEVIATION (MM)
55-63.5	+/- 0.30
70-76	+/- 0.35
80-90	+/- 0.40

TOLERANCES, WALL THICKNESS ACCORDING TO EN 10305-3

Tolerance for wall thickness (T) is at T less than or equal to 1.5 mm +/- 0.15 mm and with T greater than 1.5 mm +/- 10% of nominal size – but at the most, 0.35 mm. The stated size deviations do not apply to the weld zone.

Heléns comment: Inner diameter not given.

TOLERANCE FOR HEIGHT OF INTERNAL WELD BEAD ACCORDING TO HELÉNS' STANDARD SPECIFICATION

The tolerance for the height of the internal weld bead for material with wall thickness (T) up to 1.5 mm, is max. 0.6 mm. For material with T between 1.5 mm to 4.0 mm, the maximum height of the internal weld seam is 0.4 x T.

STRAIGHTNESS

Straightness deviation may be 0.20% of the total length for tubes with OD greater than 15 mm. The straightness tolerance shall never exceed 3 mm per meter. This tolerance is measured between the tube and a straight line that connects any two points at a distance of 1000 mm. With fixed lengths up to max. 1000 mm, the straightness deviation may be up to 0.3% of any tube length. Tubes that have an outer diameter that is less than 15 mm, are delivered commercially straightened.

Heléns comment: Demands in excess of the above measuring method, straightness tolerance, etc. shall be the subject of an agreement.

TUBE ENDS

Tubes are cut wherever possible at right angles to the axis of the tube. Tubes can be delivered with the ends produced by the cutting method usually used. Depending on the cutting method, diametrical changes outside the normal tolerances can occur. For fixed lengths, the characteristics of the ends shall be the subject of agreement.

TOLERANCE OF DELIVERED QUANTITIES

With fixed lengths, delivery of quantities less than ordered is not allowed. Delivery of excess quantities is permitted in accordance with the ordered quantity as below:

Up to 500 m,	permitted deviation +20%
500–2000 m,	permitted deviation +15%
greater than 2000 m,	permitted deviation +10%

SQUARE WELDED PRECISION STEEL TUBES

According to EN 10305-3. Our stock is manufactured from tubes made from cold rolled strip; E220, S3 + CR2 or pickled hot rolled strip; E220, S2 + CR2. The tube is stocked in fabrication lengths of 6100 mm and is lightly oiled.

PRODUCT INFORMATION

OD	OD	WALL	KG/M	S2	S3
12.00	12.00	1.00	0.345		×
15.00	15.00	1.50	0.632		×
15.00	15.00	2.00	0.810	×	
16.00	16.00	1.50	0.679		×
19.00	19.00	1.50	0.820		×
20.00	10.00	1.00	0.438		×
20.00	10.00	1.50	0.632		×
20.00	15.00	1.50	0.750		×
20.00	20.00	1.00	0.595		×
20.00	20.00	1.25	0.733		×
20.00	20.00	1.50	0.868		×
20.00	20.00	2.00	1.120		×
22.00	22.00	1.50	0.962		×
22.00	22.00	2.00	1.250	×	
25.00	10.00	2.00	0.970		×
25.00	15.00	2.00	1.120		×
25.00	20.00	2.00	1.260	×	
25.00	25.00	1.25	0.930		×
25.00	25.00	1.50	1.092		×
25.00	25.00	2.00	1.440	×	
30.00	10.00	1.50	0.880		×
30.00	15.00	1.50	0.985		×
30.00	15.00	2.00	1.280	×	
30.00	20.00	1.25	0.932		×
30.00	20.00	1.50	1.100	×	
30.00	20.00	2.00	1.440	×	
30.00	30.00	1.50	1.340	×	
30.00	30.00	2.00	1.750	×	
30.00	30.00	2.50	2.160	×	
32.00	32.00	2.50	2.316	×	
35.00	15.00	1.50	1.110		×
35.00	15.00	2.00	1.440	×	
35.00	20.00	1.50	1.220	×	
35.00	20.00	2.00	1.590	×	
35.00	25.00	2.00	1.758	×	

OD	OD	WALL	KG/M	S2	S3
35.00	35.00	1.50	1.570	×	
35.00	35.00	2.00	2.070	×	
40.00	20.00	1.50	1.340	×	
40.00	20.00	2.00	1.730	×	
40.00	20.00	1.50	1.460	×	
40.00	25.00	2.00	1.910	×	
40.00	30.00	1.50	1.570	×	
40.00	30.00	2.00	2.070	×	
40.00	40.00	1.50	1.810	×	
40.00	40.00	2.00	2.380	×	
40.00	40.00	2.50	2.930	×	
40.00	40.00	3.00	3.330	×	
45.00	15.00	1.50	1.342	×	
45.00	15.00	2.00	1.750	×	
45.00	25.00	2.00	2.050	×	
45.00	45.00	2.00	2.690	×	
50.00	20.00	1.50	1.570	×	
50.00	20.00	2.00	2.070	×	
50.00	25.00	1.50	1.690	×	
50.00	30.00	2.00	2.380	×	
50.00	30.00	2.50	2.930	×	
50.00	50.00	1.50	2.280	×	
50.00	50.00	2.00	3.010	×	
50.00	50.00	2.50	3.720	×	
50.00	50.00	3.00	4.250	×	
55.00	34.00	2.00	2.669	×	
60.00	20.00	2.00	2.390	×	
60.00	30.00	2.00	2.690	×	
60.00	40.00	1.50	2.280	×	
60.00	40.00	2.00	3.010	×	
60.00	60.00	2.00	3.640	×	
70.00	20.00	2.00	2.700	×	
70.00	30.00	2.50	3.720	×	
80.00	40.00	2.00	3.640	×	
80.00	40.00	2.50	4.510	×	

FORGING TUBE

Forging tube in quality S235JR is a low-cost alternative that is perfectly suited for simpler types of construction with lower demands on the surface finish. Max Si content is 0.03% and it is suitable for hot dip galvanizing. The tube is unpickled and dry. Length of all forging tubes is 6000 mm -0/+50 mm.

PRODUCT INFORMATION

OD	OD	WALL	KG/M	UNPICKLED
30.00	30.00	2.00	1.750	×
40.00	40.00	2.00	2.380	×
50.00	30.00	2.00	2.380	×
50.00	50.00	2.00	3.010	×

OD	OD	WALL	KG/M	UNPICKLED
50.00	50.00	3.00	4.250	×
60.00	30.00	3.00	3.800	×
60.00	40.00	2.00	3.010	×
60.00	60.00	3.00	5.220	×

DELIVERY CONDITION

	DESIGNATION	ACCORDING TO EN 10305-3	DESCRIPTION
Welded and cold sized	+ CR1	BKM	Not normally heat treated, but intended for final annealing
Welded and cold sized	+ CR2	BKM	Not intended for heat treatment
Annealed	+ A	GBK	Annealed in a controlled atmosphere
Normalised	+ N	NBK	Normalised in a controlled atmosphere

We mainly stock tubes in accordance with +CR2..

Tubes in accordance with +CR 1 may occur in certain dimensions.

Tubes in accordance with +A and +N can be offered on request.

SURFACE CHARACTERISTIC

	DESIGNATION	SURFACE FINENESS RA VALUE*	USE
Unpickled hot strip	S1	-	
Pickled hot strip	S2	2.0 my	Painting, electro-galvanizing, suitable for hot galvanizing
Cold-rolled strip	S3	0.6 my	Painting and electro-galvanizing.
Surface treated strip	S4	-	For demanding corrosion conditions

* The Ra values given in the table do not apply to the weld seam area.

GALVANIZED TUBES

DESIGNATION	SURFACE PATTERN	ZINC COATING MASS	ZINC COATING THICKNESS
Z275	M	275g/m²	20 my

Galvanized tubes can be delivered in other thicknesses depending on your needs, 100-350 g/m².

MECHANICAL CHARACTERISTICS

MATERIAL	DELIVERY CONDITION	ReHMPa	RmMPa	A5 %
E220*	+CR2	220	310	23
E235	+CR1	-	390	7
E370	+CR2	370	450	15
E355	+CR1	-	540	5

The mechanical valuesapply to completed tubes. The designation of the steel states the nominal minimum yield strength in completed tubes.

* Standard material

TOLERANCES

For tube of type +CR1 and +CR2, the diametrical deviation in the table applies. Permitted diametrical deviation includes any ovality.

Heléns comment: For heat treated tube, e.g. annealed (+A) or normalised (+N), the diametrical tolerance dependant on the dimension can be larger.

OD H. NOM. MEASUREMENT (MM)	OD W. NOM. MEASUREMENT (MM)	PERMITTED DEVIATION
15-20	15-20	+/- 0.20 mm
25-35	15-35	+/- 0.25 mm
40-50	20-50	+/- 0.30 mm
60	20-60	+/- 0.35 mm
70	40-70	+/- 0.40 mm
80	20-80	+/- 0.50 mm
90	90	+/- 0.60 mm
100	40-100	+/- 0.65 mm
120	40-60	+/- 0.70 mm

TOLERANCES, WALL THICKNESS ACCORDING TO EN 10305-3

Tolerance for wall thickness (T) is at T less than or equal to 1.5 mm +/- 0.15 mm and with T greater than 1.5 mm +/- 10% of nominal size – but at the most, 0.35 mm. The stated size deviations do not apply to the weld zone.

Heléns comment: Inner diameter not given.

TOLERANCE FOR HEIGHT OF WELD SEAM ACCORDING TO HELÉNS' STANDARD SPECIFICATION

The tolerance for the height of the weld seam for material with wall thickness (T) up to 1.5 mm, is max. 0.6 mm. For material with T between 1.5 mm to 4.0 mm, the maximum height of the weld seam is 0.4 x T.

CURVATURE

Within the permitted height and width, the side surfaces may be dished inwards or outwards.

RIGHT-ANGULARITY

Right-angle deviation may be 1°.

TWISTING

Twisting may be 1°/meter.

STRAIGHTNESS

Straightness deviation may be 0.25% of the total length for tubes with sides less than or equal to 30 mm and 0.15% on tubes with sides* larger than 30 mm. The straightness tolerance shall never exceed 3 mm per meter. This tolerance is measured between the tube and a straight line that connects any two points at a distance of 1000 mm. With fixed lengths up to max. 1000 mm, the straightness deviation may be up to 0.3% of any tube length.

Heléns comment: Demands in excess of the above measuring method, straightness tolerance, etc. shall be the subject of an agreement.

TUBE ENDS

Tubes are cut wherever possible at right angles to the axis of the tube. Tubes can be delivered with the ends produced by the cutting method usually used. This may cause diametrical changes outside the normal tolerances to occur. For fixed lengths, the characteristics of the ends shall be the subject of agreement.

TOLERANCE OF DELIVERED QUANTITIES

With fixed lengths, delivery of quantities less than ordered is not allowed. Delivery of excess quantities is permitted in accordance with the ordered quantity as below:

Up to 500 m,	permitted deviation +20%
500–2000 m,	permitted deviation +15%
greater than 2000 m,	permitted deviation +10%

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

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		Welded	BK	0.15	0.30	0.60	0.025	0.025	-	min 460	6
	EN 10305-2		NBK	0.15	0.30	0.60	0.025	0.025	205	310-410	28