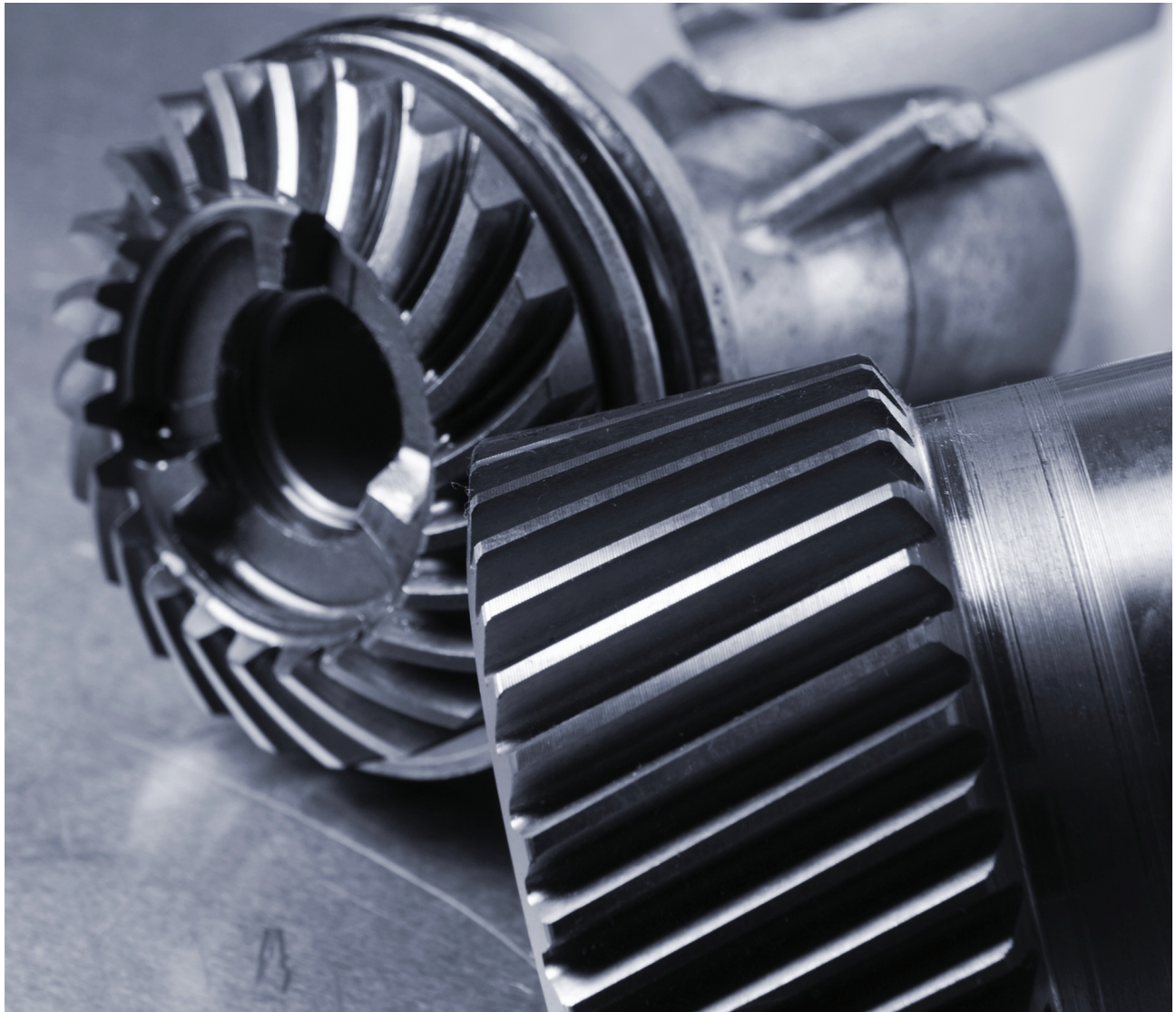


# SEAMLESS PIPES FOR MECHANICAL APPLICATIONS EN 10297-1

Seamless circular steel tubes for mechanical and general engineering purposes

## Chemical composition

Steel grade	Elements content, %												
	C	Si	Mn	P	S	Cr	Mo	Ni	Al	Cu	N	Nb	V
E235	≤0,17	≤0,35	≤1,2	≤0,030	≤0,035								
E275	≤0,21	≤0,35	≤1,4	≤0,030	≤0,035								
E315	≤0,21	≤0,30	≤1,5	≤0,030	≤0,035								
E355	≤0,22	≤0,55	≤1,6	≤0,30	≤0,035								
E470	0,16-0,22	0,10-0,50	1,30-1,70	≤0,030	≤0,035				≥ 0,010		≤ 0,020	≤ 0,07	0,08-0,15
E275K2	≤0,20	≤0,4	0,50-1,40	≤0,030	≤0,035	≤0,030	≤0,010	≤0,030	≥ 0,020	≤0,035	≤ 0,015	≤ 0,05	≤ 0,05
E355K2	≤0,20	≤0,5	0,90-1,65	≤0,030	≤0,035	≤0,030	≤0,010	≤0,050	≥ 0,020	≤0,035	≤ 0,015	≤ 0,05	≤ 0,12
E420J2	0,16-0,22	0,10-0,50	1,30-1,70	≤0,030	≤0,035	≤0,030	≤0,080	≤0,040	≥ 0,010	≤0,030	≤ 0,020	≤ 0,07	0,08-0,15
E460K2	≤0,20	≤0,6	1,00-1,70	≤0,030	≤0,035	≤0,030	≤0,010	≤0,080	≥ 0,020	≤0,070	≤ 0,025	≤ 0,05	≤ 0,02
E590K2	0,16-0,22	0,10-0,50	1,30-1,70	≤0,030	≤0,035	≤0,030	≤0,080	≤0,040	≥ 0,010	≤0,030	≤ 0,020	≤ 0,07	0,08-0,15
E730K2	≤0,20	≤0,5	1,40-1,70	≤0,030	≤0,035	≤0,030	0,30-0,45	0,30-0,70	≥ 0,020	≤0,020	≤ 0,020	≤ 0,05	≤ 0,12
25CrMo4	0,22-0,29	≤0,4	0,6-0,9	≤0,035	≤0,035	0,9-1,2	0,15-0,30						
34CrMo4	0,30-0,37	≤0,4	0,6-0,9	≤0,035	≤0,035	0,9-1,2	0,15-0,30						
42CrMo4	0,38-0,45	≤0,4	0,6-0,9	≤0,035	≤0,035	0,9-1,2	0,15-0,30						



## Mechanical properties

Steel grade	Delivery condition	Yield strength, R <sub>el</sub> , N/mm <sup>2</sup>			Tensile strength R <sub>m</sub> , N/mm <sup>2</sup>			Elongation A, %		Impact test, KV, J	
		Wall thickness T <sub>n</sub> , mm			Wall thickness T <sub>n</sub> , mm					Test temperature -20°C	
		<16	16<T <sub>n</sub> ≤40	40<T <sub>n</sub> ≤65	<16	16<T <sub>n</sub> ≤40	40<T <sub>n</sub> ≤65	Longitudinal direction	Transverse direction	Longitudinal direction	Transverse direction
		Not less									
E235	+AR or +N	235	225	215	360	360	360	25	23	-	
E275	+AR or +N	275	265	255	410	410	410	22	20	-	
E315	+AR or +N	315	305	295	450	450	450	21	19	-	
E355	+AR or +N	355	345	335	490	490	490	20	18	-	
E470	+AR	470	430	-	650	600	-	17	15	-	
E275K2	+N	275	265	255	410	410	410	22	20	40	27
E355K2	+N	355	345	335	490	490	470	20	18	40	27
E420J2	+N	420	400	390	600	560	530	19	17	27	20
E460K2	+N	460	440	430	550	550	550	19	17	40	27
E590K2	+QT*	590	540	-	700	650	-	16	14	40	27
E730K2	+QT*	730	670	-	790	750	-	15	13	40	27

### Note:

\* - at +QT conditions pipes with outside diameter ≥100 mm and wall thickness ≤ 28 mm can be produced.

Steel grade	Delivery condition	Yield strength, R <sub>el</sub> , N/mm <sup>2</sup>				Tensile strength R <sub>m</sub> , N/mm <sup>2</sup>				Elongation A, %						Impact test, KV, J Test temperature +20°C						
		Wall thickness T <sub>n</sub> , mm																				
		<8	8<T <sub>n</sub> ≤20	20<T <sub>n</sub> ≤50	50<T <sub>n</sub> ≤80	<8	8<T <sub>n</sub> ≤20	20<T <sub>n</sub> ≤50	50<T <sub>n</sub> ≤80	<8	8<T <sub>n</sub> ≤20	20<T <sub>n</sub> ≤50	50<T <sub>n</sub> ≤80	<8	8<T <sub>n</sub> ≤20	20<T <sub>n</sub> ≤50	l	l	t	l	l	t
		Not less																				
25CrMo4	+QT*	700	600	450	400	900	800	700	700	12	10	14	12	15	13	16	14	45	50	32	50	32
34CrMo4	+QT**	800	650	550	500	1000	900	800	750	11	9	12	10	14	12	15	13	35	40	25	45	27
42CrMo4	+QT***	900	750	650	550	1100	1000	900	800	10	8	11	9	12	10	13	10	30	35	22	35	22

### Note:

l – Longitudinal sample, t – Transversal sample

\* - at +QT conditions pipes with outside diameter ≥100 mm and wall thickness ≤ 28 mm may be produced, for pipes with other dimensions +QT conditions are modeled on samples.

\*\* - pipes are supplied at +AR conditions, +QT conditions are modeled on samples.

\*\*\*- - pipes are supplied at +A conditions, +QT conditions are modeled on samples.

## Cold-rolled

OD (mm)	Wall thickness, mm														
	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	11,0	12,5	14,2	16,0	
33,7															
35,0															
38,0															
40,0															
42,4															
44,5															
48,3															
51,0															
54,0															
57,0															
60,3															
63,5															
70,0															
73,0															
76,1															
82,2															

## Hot-rolled

Outside diameter	Wall thickness																													
	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10,0	11,0	12,5	14,2	16,0	17,5	20,0	22,2	25,0	28,0	30,0	32,0	36,0	40,0	45,0	50,0	55,0	60,0	65,0	
33,7																														
38,0																														
42,4																														
48,3																														
51																														
57																														
60,3																														
63,5																														
73,0																														
76,1																														
82,5																														
88,9																														
101,6																														
108,0																														
114,3																														
121,0																														
127,0																														
133,0																														
139,7																														
141,3																														
152,4																														
159,0																														
168,3																														
177,8																														
193,7																														
203,0																														
219,1																														
229,0																														
244,5																														
273,0																														
298,5																														
323,9																														
355,6																														
368,0																														

## Dimensional tolerances

Outside diameter, mm	Permissible deviation of Outside Diameter	Permissible deviation of Wall Thickness for WT/OD		
		OD/WT < 0,025	0,025 < OD/WT ≤ 0,05	OD/WT > 0,05
≤ 219,1	± 1% or 0,5 mm - the greatest value	± 12,5 % or ± 0,4 mm - the greatest value		
> 219,1	± 1%	± 20%	± 15%	± 12,5%

## Lengths

Pipes are supplied with lengths according to standard requirements.

Any lengths different from the standard ones are subject to additional negotiations.

## Protection

Pipes are supplied:

- black and bare
- external varnished with black or clear lacquer
- oiled

Upon request pipes ends are protected with plastic caps.

## Marking

Pipes are supplied with marking according to standards and customer requests.

Marking is painted and/or hard stenciled on pipes ends. The same data, as well as additional information according to customer's request, are indicated on the bundle tags.

## Certification

Pipes are supplied with 3.1. inspection certificate, in conformity with EN 10204.