EN10297-1 European Standard (Seamless Round Steel Pipe for Machinery and General Engineering Purpose)

Standard:

EN10297-1

Application:

Unalloyed steel pipe

Chemical Composition

Steel Grade		C		Si		Mn		P	S	Other Elements
Steel Name	Steel No.	min.	max.	mix.	max.	min.	max.	min.	max.	
E236	1.0308	-	0.17	-	0.35	-	1.20	0.030	0.035	
E275	1.0225	-	0.21	-	0.35	-	1.40	0.030	0.035	
E315	1.0236	-	0.21	-	0.30	-	1.50	0.030	0.035	
E355a	1.0580	-	0.22	-	0.55	-	1.60	0.030	0.035	
E470	1.0536	0.16	0.22	0.10	0.50	1.30	170	1.030	0.035	AI: min.0.010;N: max.0.020; Nb: max.0.07; V: 0.05-0.15
C22E	1.1151	0.17	0.24	-	0.40	0.40	0.70	0.035	0.035	b
C35E	1.1181	0.32	0.39	-	0.40	0.50	0.80	0.035	0.035	b
C45E	1.1191	0.42	0.50	-	0.40	0.50	0.80	0.035	0.035	b
C60E	1.1221	0.57	0.65	-	0.40	0.60	0.90	0.035	0.035	b
38Mn6	1.1127	0.34	0.42	0.15	0.35	1.40	1.65	0.035	0.035	b

a. Manufacturers can add niobium, vanadium and titanium on demand. However, composition and content of these elements shall be specified.

b: Cr: max.0.40%; Mo: max.0.10%; Ni: max.0.40%; Cr+Mo+Ni max.0.63%

Mechanical Properties

Steel Grade	Minimum Mechanical Properties										
	Yield Strength (ReH) Mpa[a]					Tensile Strength (Rm) Mpa				Elongation A%	
	For T in mm					For T in mm					
	≤16	>16 ≤40	>40 ≤65	>65 ≤80	>80 ≤100	≤16	>16 ≤40	>40 ≤65	>80 ≤100	|	|

E235	235	225	215	205	195	360	360	360	340	25	23
E275	275	265	255	245	235	410	410	410	380	22	20
E315	315	305	295	280	270	450	450	450	420	21	19
E355	355	345	335	315	295	490	490	490	470	20	18
E470	470	430	-	-	-	650	600	-	-	17	15

Steel Grade	Yield Strength (ReH) Mpa[a]			Tensile Strength (Rm) Mpa			Elongation A%					
	For T in mm			For T in mm			≤16		>16≤40		>40≤80	
	≤16	>16 ≤40	>40 ≤80	≤16	>16 ≤40	>40 ≤40	l	t	l	t	l	t
C22E	240	210	210	430	410	410	24	22	25	23	25	23
C35E	300	270	270	550	520	520	18	16	19	17	19	17
C45E	340	305	305	620	580	580	14	12	16	14	16	14
C60E	190	350	340	710	670	370	10	8	11	9	11	9
38Mn6	400	380	360	670	620	570	14	12	15	13	16	14

Alloyed Steel Pipe:

Chemical Composition

Steel Grade	C		Si		Mn		P	S	Cr		Mo		Ni		Al[a]	Cu	N	Nb	Ti	V	
	min.	max.	min.	max.	min.	max.	max.	max.	max.	min.	max.	min.	max.	min.	max.	max.	max.	max.	max.	min.	max.
E275K2	-	0.20	-	0.40	0.50	1.40	0.030	0.030	0.30	-	0.10	-	0.30	0.020	0.35	0.015	0.05	0.03	-	0.05	
E355K2	-	0.20	-	0.50	090	1.65	0.030	0.030	0.30	-	0.10	-	0.50	0.020	0.35	0.015	0.05	0.05	-	0.15	
E420K2	0.16	0.22	0.10	0.50	1.30	1.70	0.030	0.035	0.30	-	0.08	-	0.40	0.010	0.30	0.020	0.07b	0.05	0.08	0.15b	
E460K2	-	0.20	-	0.60	1.00	1.70	0.030	0.030	0.30	-	010	-	0.80	0.020	0.70	0.025	0.05b	0.05	-	0.20b	
E590K2	0.16	0.22	0.10	0.50	1.30	1.70	0.030	0.035	0.30	-	0.08	-	0.40	0.010	0.30	0.020	0.07b	0.05	0.08	0.15b	
E730K2	-	0.20	-	0.50	1.40	1.70	0.025	0.025	0.30	0.30	0.45	0.30	0.70	0.020	0.20	0.020	0.02	0.05	-	0.12	
Steel Grade	C		Si		Mn		P	S	Cr		Mo		Ni		Cu						
	min.	max.	min.	max.	min.	max.	max.	max.	min.	max.	min.	max.	min.	max.	max.						
41Cr4	0.38	0.45	-	0.40	0.60	0.90	0.035	0.035	0.90	1.20	-	-	-	-	-	-	-	-	-	-	
25CrMo4	0.22	0.29	-	0.40	0.60	0.90	0.035	0.035	0.90	1.20	0.15	0.30	-	-	-	-	-	-	-	-	
30CrMo4	0.27	0.34	-	0.35	0.35	0.60	0.035	0.035	0.80	1.15	0.15	0.30	-	-	-	-	-	-	-	-	
34CrMo4	0.30	0.37	-	0.40	0.60	0.90	0.035	0.035	0.90	1.20	0.15	0.30	-	-	-	-	-	-	-	-	
42CrMo4	0.38	0.45	-	0.40	0.60	0.90	0.035	0.035	0.90	1.20	0.15	0.30	-	-	-	-	-	-	-	-	
36CrNiMo4	0.32	0.40	-	0.40	0.50	0.80	0.035	0.035	0.90	1.20	0.15	0.30	0.90	1.20	-	-	-	-	-	-	
30CrNiMo4	0.26	0.34	-	0.40	0.30	0.30	0.035	0.035	1.8	2.20	0.30	0.50	1.80	2.20	-	-	-	-	-	-	

41NiCrMo7-3-2	0.38	0.44	-	0.30	0.60	0.90	0.025	0.025	0.70	0.90	0.15	0.30	1.65	2.00	0.25	-	-	-	-	-

Mechanical Properties

Steel Grade	Minimum Mechanical Properties											Impact Properties	
	Yield Strength (ReH) Mpa[a]					Tensile Strength (Rm) Mpa				Elongation A%		Minimum average absorbed energy, KV min.Jata test temperature of -20℃	
	For T in mm					For T in mm							
	≤16	>16 ≤40	>40 ≤65	>65 ≤80	>80 ≤100	≤16	>16 ≤40	>40 ≤65	>65 ≤100	l	t	l	t
E275K2	275	265	255	245	235	410	410	410	380	22	20	40	27
E355K2	355	345	335	315	295	490	490	470	470	20	18	40	27
E420K2	420	400	390	370	360	600	560	530	500	19	17	27	20
E460K2	460	440	430	410	390	550	550	550	520	19	17	40	27
E590K2	590	540	480	455	420	700	650	570	520	16	14	40	27
E275K2	730	670	620	580	540	790	750	700	680	15	13	40	27

Steel Grade	Yield Strength (ReH) Mpa[a]				Tensile Strength (Rm) Mpa				Elongation A%							
	For T in mm				For T in mm											
	≤8	>8 ≤20	>20 ≤50	>50 ≤80	≤8	>8 ≤20	>20 ≤50	>50 ≤80	≤8		>8 ≤20		>20 ≤50		>50 ≤80	
									l	t	l	t	l	t	l	t
41Cr4	800	660	560	-	1000	900	800	-	11	9	12	10	15	13	16	14
25CrMo4	700	600	450	400	900	800	700	650	12	10	14	12	15	13	16	14
30CrMo4	750	630	520	480	950	850	750	700	12	10	13	11	14	12	15	13
34CrMo4	800	650	550	500	1000	900	800	750	11	9	12	10	14	12	15	13
42CrMo4	900	750	650	550	1100	1000	900	800	10	8	11	9	12	10	13	11
36CrNiMo4	900	800	700	600	1100	1000	900	800	10	8	11	9	12	10	13	11
30CrNiMo4	1050	1050	900	800	1250	1250	1100	1000	9	7	9	7	10	8	11	9
41NiCrMo7-3-2	950	870	800	750	1150	1050	1000	900	9	7	10	8	11	9	12	10

Remarks

HR: hot rolled	CW: cold worked	SR: stress relieved
A: annealed	N: normalized	HF