

MEKANİK VE KONSTRÜKSİYON BORULARI

*MECHANICAL AND
CONSTRUCTION
PIPES*



MEKANİK ÇELİK ÇEKME BORULAR DIN 1629, EN10216-1, GOST 8731-8732

MECHANICAL STEEL SEAMLESS PIPES

Kimyasal Kompozisyon / Chemical Composition

Standart Standard	Kalite Grade	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	V	Al	N	Nb,Ti, B,As,W
DIN 1629	St 37.0	≤ 0.17			≤ 0.040	≤ 0.040							0.009 - 0.014	
DIN 1629	St 44.0	≤ 0.21			≤ 0.040	≤ 0.040							0.009 - 0.014	
DIN 1629	St 52.0	≤ 0.22	≤ 1.60	≤ 0.55	≤ 0.040	≤ 0.035						≤ 0.020	0.009 - 0.014	
EN 10216-1	P195TR1	≤ 0.13	≤ 0.70	≤ 0.35	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.30	≤ 0.30	≤ 0.08	≤ 0.020			
EN 10216-1	P195TR2	≤ 0.13	≤ 0.70	≤ 0.35	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.30	≤ 0.30	≤ 0.08	≤ 0.020	≤ 0.020		
EN 10216-1	P235TR1	≤ 0.16	≤ 1.20	≤ 0.35	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.30	≤ 0.30	≤ 0.08	≤ 0.020			≤ Nb = 0.010.Ti - 0.04 Cr + Cu + Mo + Ni ≤ 0.7
EN 10216-1	P235TR2	≤ 0.16	≤ 1.20	≤ 0.35	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.30	≤ 0.30	≤ 0.08	≤ 0.020	≤ 0.020		≤ Nb = 0.010.Ti - 0.04 Cr + Cu + Mo + Ni ≤ 0.7
EN 10216-1	P265TR1	≤ 0.20	≤ 1.40	≤ 0.40	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.30	≤ 0.30	≤ 0.08	≤ 0.020			≤ Nb = 0.010.Ti - 0.04 Cr + Cu + Mo + Ni ≤ 0.7
EN 10216-1	P265TR2	≤ 0.20	≤ 1.40	≤ 0.40	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.30	≤ 0.30	≤ 0.08	≤ 0.020	≤ 0.020		≤ Nb = 0.010.Ti - 0.04 Cr + Cu + Mo + Ni ≤ 0.7
EN 10216-3	P355N	≤ 0.20	0.90 - 1.70	≤ 0.50	≤ 0.025	≤ 0.020	≤ 0.30	≤ 0.50	≤ 0.30	≤ 0.08	≤ 0.10	≤ 0.020	≤ 0.020	Nb + Ti + V ≤ 0.12

Mekanik Özellikler / Mechanical Properties

Standart Standard	Kalite Grade	Isıl İşlem Heat Treatment	Akma Noktası Re Min.(MPa) Yield Strength (MPa)			Kopma Dayanımı Rm (Mpa) Tensile Strength (Mpa)	Uzama A5 Min (%) Elongation A5 Min (%)	Darbe Enerjisi (J) Impact Energy (J)	Uygulama Sıcaklığı (°C) Temperature of Application (°C)
			t 0 - 16 mm	t 16 - 40 mm	t 40 - 65 mm				
DIN 1629	St 37.0	U, N	235	225	215	350 - 480	25		300
DIN 1629	St 44.0	U, N	275	265	225	420 - 550	21		300
DIN 1629	St 52.0	U, N	355	345	335	500 - 650	21		300
EN 10216-1	P195TR1	U, N	195	185	175				
EN 10216-1	P195TR2	U, N	195	185	175	320 - 440	27		
EN 10216-1	P235TR1	U, N	235	225	215	360 - 500	25		
EN 10216-1	P235TR2	U, N	235	225	215	360 - 500	25	KV = 27 (0°C)	
EN 10216-1	P265TR1	U, N	265	255	245	410 - 570	21		
EN 10216-1	P265TR2	U, N	265	255	245	410 - 570	21	KV = 27 (0°C)	
EN 10216-3	P355N	U	355	345	335	490 - 650	22	KV = 27 (-20°C)	

Tolerans DIN 1629 / Tolerance

Dış Çap Outside Diameter	Dış Çap Tolerans Outside Diameter Tolerance	Dış Çap Outside Diameter	Et Kalınlığı Tolerans Wall Thickness Tolerance
D ≤ 100 mm	± 1% D (± 0,5 mm)	D ≤ 130 mm	t ≤ 2 2 < t ≤ 4 t > 4 + 15% / -10 % + 12,5 % / -10 % ± 9%
100 < D < 200	± 1% D	130 < D ≤ 320 mm	t ≤ 0,05 D 0,05 D < t ≤ 0,11 D t > 0,11 D + 17,5 % / -12,5 % ± 12,5 % ± 10%
D > 200 mm	± 1% D	320 < D ≤ 660 mm	t ≤ 0,05 D 0,05 D < t ≤ 0,09 D t > 0,09 D + 20% / -15 % + 15% / -12,5 % + 12,5% / -10 %

EN 10216-1, EN 10216-3

Dış Çap Outside Diameter	Dış Çap Outside Diameter	t / D oranına göre et kalınlığı toleransı / wall thickness acc. to t / D			
		t/D ≤ 0,025	0,025 < t/D ≤ 0,05	0,05 < t/D ≤ 0,01	t/D > 0,1
D ≤ 291,1 mm	± 1% veya ± 0,5 mm	± 12,5% veya ± 0,4 mm			
D > 291,1 mm	± 1% veya ± 0,5 mm	± 20%	± 15%	± 12,5%	± 10%

ÇELİK ÇEKME KONSTRÜKSİYON BORULARI DIN 17121, EN 10210, GOST 8731-8732

STRUCTURAL STEEL SEAMLESS PIPES

Kimyasal Kompozisyon / Chemical Composition

Standart Standard	Kalite Grade	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	V	Al	N	Nb,Ti, B,As,W
DIN 1630	St 37.4	≤ 0.17	≥ 0.35	≤ 0.35	≤ 0.040	≤ 0.040						≥ 0.020		
DIN 1630	St 44.4	≤ 0.20	≥ 0.40	≤ 0.35	≤ 0.040	≤ 0.040						≥ 0.020		
DIN 1630	St 52.4	≤ 0.22	≥ 1.60	≤ 0.55	≤ 0.040	≤ 0.350						≥ 0.020		
DIN 17121	St 37.2	≤ 0.17			≤ 0.050	≤ 0.050							0.009	
DIN 17121	St 37.3	≤ 0.17			≤ 0.040	≤ 0.040						≥ 0.020		
DIN 17121	St 44.2	≤ 0.21			≤ 0.050	≤ 0.050							0.009	
DIN 17121	St 44.3	≤ 0.20			≤ 0.040	≤ 0.040						≥ 0.020		
DIN 17121	St 52.3	≤ 0.22	≤ 1.60	≤ 0.55	≤ 0.040	≤ 0.040						≥ 0.020		
EN 10210-1	S235JRH	≤ 0.17	≤ 1.40		≤ 0.040	≤ 0.040							≤ 0.009	
EN 10210-1	S275J0H	≤ 0.20	≤ 1.50		≤ 0.035	≤ 0.035							≤ 0.009	
EN 10210-1	S275J2H	≤ 0.20	≤ 1.50		≤ 0.030	≤ 0.030						≥ 0.020		
EN 10210-1	S355J0H	≤ 0.22	≤ 1.60	≤ 0.55	≤ 0.035	≤ 0.035							≤ 0.009	
EN 10210-1	S355J2H	≤ 0.22	≤ 1.60	≤ 0.55	≤ 0.030	≤ 0.030						≥ 0.020		
EN 10210-1	S355K2H	≤ 0.22	≤ 1.60	≤ 0.55	≤ 0.030	≤ 0.030	0.30	0.30	0.30					

Mekanik Özellikler / Mechanical Properties

Standart Standard	Kalite Grade	Isıl İşlem Heat Treatment	Akma Noktası Re Min.(MPa) Yield Strength (MPa)			Kopma Dayanımı Rm (Mpa) Tensile Strength (Mpa)	Uzama A5 Min (%) Elangation A5 Min (%)	Darbe Enerjisi (J) Impact Energy (J)	Uygulama Sıcaklığı (°C) Temperature of Application (°C)
			t 0 - 16 mm	t 16 - 40 mm	t 40 - 65 mm				
DIN 1630	St 37.4	U, N	235	225	215	350 - 480	25	T = 27 (0°C)	300
DIN 1630	St 44.4	U, N	275	265	225	420 - 550	21	T = 27 (0°C)	300
DIN 1630	St 52.4	U, N	335	345	335	500 - 650	21	T = 27 (0°C)	300
DIN 17121	St 37.2	U, N	235	225	215	340-470	26	KV = 27	300
DIN 17121	St 37.3	U, N	235	225	215	340-470	26	KV = 27 (-20°C)	300
DIN 17121	St 44.2	U, N	275	265	255	410-540	22	KV = 27	300
DIN 17121	St 44.3	U, N	275	265	255	410-540	22	KV = 27 (-20°C)	300
DIN 17121	St 52.3	U, N	355	345	335	490-630	22	KV = 27 (-20°C)	300
EN 10210-1	S235JRH	U, N	235	225	215	360-510	26	L = 27	20
EN 10210-1	S275J0H	U, N	275	265	255	410-560	23	L = 27 (0°C)	20
EN 10210-1	S275J2H	U, N	275	265	255	410-560	23	L = 27 (-20°C)	300
EN 10210-1	S355J0H	U, N	355	345	335	470-630	22	L = 27 (0°C)	20
EN 10210-1	S355J2H	U, N	355	345	335	470-630	22	L = 27 (-20°C)	300
EN 10210-1	S355K2H	U, N	355	345	335	470-630	22	L = 27 (-20°C)	300

Tolerans DIN 17121 / Tolarence

Dış Çap Outside Diameter	Dış Çap Tolerans Outside Diameter Tolerance	Dış Çap Outside Diameter	Et Kalınlığı Tolerans Wall Thickness Tolerance	
D ≤ 100 mm	± 1% D (± 0,5 mm)	D ≤ 130 mm	t ≤ 2 2 < t ≤ 4 t > 4	+ 15% / -10 % + 12,5 % / -10 % ± 9%
100 < D < 200	± 1% D	130 < D ≤ 320 mm	t ≤ 0,05 D 0,05 D < t ≤ 0,11 D t > 0,11 D	+ 17,5 % / -12,5 % ± 12,5 % ± 10%
D > 200 mm	± 1% D	320 < D ≤ 660 mm	t ≤ 0,05 D 0,05 D < t ≤ 0,09 D t > 0,09 D	+ 20% / -15 % + 15% / -12,5 % + 12,5% / -10 %

EN 10210

Dış Çap Tolerans / Outside Diameter Tolerance	Et Kalınlığı Tolerans / Wall Thickness Tolerance
± 1% en az (min.) ± 0,5 mm ve en fazla (max.) ± 10 mm / ± 1% minimum (min.) ± 0.5 mm and maximum (max.) ± 10 mm	± 12,5% (Ağırlık tolerans ile sınırlıdır. / Restricted with weight tolerance)

GOST NORMU

GOST NORM

Kimyasal Kompozisyon / Chemical Composition

Standart Standard	Kalite Grade	C	Mn	Si	P	S	Cu	Ni	Cr	Mo	V	Al	N	Nb,Ti, B,As,W
GOST 8731-74 GOST 8732-78	10	0.07 - 0.14	0.35 - 0.65	0.17 - 0.37	≤ 0.035	≤ 0.040			≤ 0.15					
	20	0.17 - 0.24	0.35 - 0.65	0.17 - 0.37	≤ 0.035	≤ 0.040			≤ 0.25					
	35	0.32 - 0.40	0.50 - 0.80	0.17 - 0.37	≤ 0.035	≤ 0.040			≤ 0.25					
	45	0.42 - 0.50	0.50 - 0.80	0.17 - 0.37	≤ 0.035	≤ 0.040			≤ 0.25					
	20X	0.17 - 0.23	0.50 - 0.80	0.17 - 0.37	≤ 0.035	≤ 0.035			0.17 - 1.00					

Mekanik Özellikler / Mechanical Properties

Standart Standard	Kalite Grade	Isıl İşlem Heat Treatment	Akma Noktası Re Min. (MPa) Yield Strength (MPa)			Kopma Dayanımı Rm (Mpa) Tensile Strength (Mpa)	Uzama A5 Min (%) Elongation A5 Min (%)	Darbe Enerjisi (J) Impact Energy (J)	Uygulama Sıcaklığı (°C) Temperature of Application (°C)
			t 0 - 16 mm	t 16 - 40 mm	t 40 - 65 mm				
GOST 8731-74 GOST 8732-78	10		353			216	24		
	20		412			245	21		
	35		510			294	17		
	45		588			323	14		
	20X		431				16		

Tolerans GOST / Tolarence

Dış Çap Outside Diameter	Tolerans / Tolarence		Et Kalınlığı Tolerans Wall Thickness Tolerance	Tolerans / Tolarence	
	Yüksek Doğruluk High Accuracy	Olağan Doğruluk Usual Accuracy		Yüksek Doğruluk High Accuracy	Olağan Doğruluk Usual Accuracy
D ≤ 219.1 mm	± 0.8%	± 1%	t ≤ 15 15 < t < 30 t > 30	± 12.5 -12.5 / +10 ±10.0	± 12.5 -15.0 / +12.5 -12.5 / +10.5
D > 219.1 mm	± 1%	± 1.25%	t ≤ 15 15 < t < 30 t > 31	± 12.5 -15.0 / +12.5 -12.5 / +10.00	

KARŞILAŞTIRMA TABLOSU

COMPARISON TABLE

ALMAN NORMU (DIN) GERMAN NORM		AVRUPA NORMU (EN) EUROPE NORM	AVRUPA NORMU (EN) EUROPE NORM	AVRUPA NORMU (EN) EUROPE NORM
DIN 1629	St 37.0	A/SA 53/106 Gr. A	8731 / Gr. 10 8732 / Gr. 10	EN 10216-1 P195 / 235TR1
	St 44.0	A/SA 53/106 Gr. B	8731 / Gr. 20 8732 / Gr. 20	EN 10216-1 P245 / 265TR1
	St 52.0	-	19281 / Gr. 17G1S	EN 10216-3 P355N
DIN 17121	St 37.2 St 37.3	A/SA 53/106 Gr. A	8731 / Gr. 10 8732 / Gr. 10	EN 10216-1 P235TR1 / TR2 EN 10210 S235JRH
	St 44.2 St 44.3	A/SA 53/106 Gr. B	8731 / Gr. 20 8732 / Gr. 20	EN 10216-1 P235TR1 / TR2 EN 10210 S235JRH
	St 52.3	-	19281 / Gr. 17G1S	EN 10210 S355 J2H

Çelik Kalitesi Steel Grade		Kimyasal Kompozisyon / Chemical Composition (%)							
GOST	DIN	C	Mn	Si	P	S	Cr	N	Al
10		0.07 - 0.14	0.35 - 0.65	0.17 - 0.37	≤ 0.035	≤ 0.040	≤ 0.15	≤ 0.008	
	St 37.0	≤ 0.17	-	-	≤ 0.040	≤ 0.040	-	≤ 0.009	-
	St 37.2	≤ 0.17	-	-	≤ 0.050	≤ 0.050	-	≤ 0.009	-
	St 37.3	≤ 0.17	-	-	≤ 0.040	≤ 0.040	-	-	≥ 0.020
	St 37.4	≤ 0.17	≥ 0.35	≤ 0.35	≤ 0.040	≤ 0.040	-	-	≥ 0.020
20		0.07 - 0.24	0.35 - 0.65	0.17 - 0.37	≤ 0.035	≤ 0.040	≤ 0.25	≤ 0.008	
	St 44.0	≤ 0.21	-	-	≤ 0.040	≤ 0.040	-	≤ 0.009	-
	St 44.2	≤ 0.21	-	-	≤ 0.050	≤ 0.050	-	≤ 0.009	-
	St 44.3	≤ 0.20	-	-	≤ 0.040	≤ 0.040	-	-	≥ 0.020
	St 44.4	≤ 0.20	≥ 0.40	≤ 0.35	≤ 0.040	≤ 0.040	-	-	≥ 0.020
35		0.32 - 0.40	0.50 - 0.80	0.17 - 0.37	≤ 0.035	≤ 0.040	0.25	≤ 0.008	
40		0.42 - 0.50	0.50 - 0.80	0.17 - 0.37	≤ 0.035	≤ 0.04	≤ 0.25	≤ 0.008	-
	St 52.0	≤ 0.22	≤ 1.6	≤ 0.55	≤ 0.040	≤ 0.035	-	-	≥ 0.020
	St 52.3	≤ 0.22	≤ 1.6	≤ 0.55	≤ 0.040	≤ 0.040	-	-	≥ 0.020
	St 52.4	≤ 0.22	≤ 1.6	≤ 0.55	≤ 0.040	≤ 0.035	-	-	≥ 0.020

KARŞILAŞTIRMA TABLOSU

COMPARISON TABLE

Çelik Kalitesi Steel Grade		Kopma Dayanımı Rm Tensile Strength (Mpa)	Akma Dayanımı Re Min. Yield Strength (Mpa)			Uzama Elongation A5 Min. (%)	
GOST	DIN		t ≤ 16 mm	16 ≤ t ≤ 40	t > 40	Boyuna Longitudinal	Enine Transverse
10		≥ 353	≥ 206	≤ 0.035	≤ 0.040	24	
	St 37.0	350 - 480	≥ 235	≤ 0.040	≤ 0.040	25	23
	St 37.2	340 - 470	≥ 235	≤ 0.050	≤ 0.050	26	24
	St 37.3	340 - 470	≥ 235	≤ 0.040	≤ 0.040	26	24
	St 37.4	350 - 480	≥ 235	≤ 0.040	≤ 0.040	25	23
20		≥ 412	≥ 245	≤ 0.035	≤ 0.040	21	
	St 44.0	420 - 550	≥ 275	≤ 0.040	≤ 0.040	21	19
	St 44.2	410 - 540	≥ 275	≤ 0.050	≤ 0.050	22	20
	St 44.3	410 - 540	≥ 275	≤ 0.040	≤ 0.040	22	20
	St 44.4	420 - 550	≥ 275	≤ 0.040	≤ 0.040	21	19
35		≥ 510	≥ 294	≥ 294	≥ 294	17	
40		≥ 588	≥ 323	≥ 323	≥ 323	14	
	St 52.0	500 - 650	≥ 355	≥ 345	≥ 335	21	19
	St 52.3	490 - 630	≥ 355	≥ 345	≥ 335	22	20
	St 52.4	500 - 650	≥ 355	≥ 345	≥ 335	21	19



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