



Kullanım Alanları	650°C den düşük sıcaklıklarda ve yüksek basınç altında kazanlarda, fırınlarda, hatlarda, basınçlı kaplarda, eşanjör ve kondenserlerde kullanılır.	<i>Field of application</i>	Used for boiler, pipe lines, pressure vessels, equipment for high temperature and pressure, equipment for heat-exchanger and condenser at a temperature lower than 650 °C
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STANDARTLAR & MALZEME KALİTESİ / STANDARDS & MATERIAL QUALITY

Max.Servis Sıcaklığı Max Service Temperature	AVRUPA EUROPE EN	ALMANYA GERMANY DIN	AMERİKA USA ASTM
475°C	EN10216-2 P235GH TC1 & TC2	DIN 17175 St35.8/I & III	ASTM A106 GR.A, ASTM A179
	EN 10216-2 P265GH TC1 & TC2	DIN 17175 St45.8/I & III	ASTM A106 GR.B, ASTM A210 Gr.A1
		DIN 17175 17Mn4	ASTM A106 GR.C, ASTM A210 Gr.C
500°C	EN 10216-2 16Mo3	DIN 17175 15Mo3	ASTM A209 T1, ASTM 335 P1
560°C	EN 10216-2 13CrMo4-5	DIN 17175 13CrMo4-4	ASTM A213 T12, ASTM A335 P12
575°C		-	ASTM A213 T11, ASTM A335 P11
600°C	EN 10216-2 X11CrMo5	DIN 17175 12CrMo195	ASTM A213 T5, ASTM A335 P5
	EN 10216-2 10CrMo9-10	DIN 17175 10CrMo910	ASTM A213 T22, ASTM A335 P22
625°C	EN 10216-2 11CrMo9-10	DIN 17175 X12CrMo91	ASTM A213 T9, ASTM A335 P9
650°C	EN 10216-2 X10CrMoVNb9-1	DIN 17175 X10CrMoVNb9-1	ASTM A213 T91, ASTM A335 P91

Ebat Aralığı Dış Çap Et Kalınlığı	10,2 "den 711 mm "e kadar 1,00"mm den 100 mm"e kadar	Dimension Range Outer Diameter(OD) Wall Thickness	10,2 up to 711 mm 1,00 mm up to 100 mm
Boru Toleransı Dış çap İç çap	±1% ya da ±0,5mm hangisi büyükse ±1% ya da ±2 mm hangisi büyükse	Tube Tolerance Outer Diameter Inner Diameter	±1%or±0,5mm whichever is the greater ±1% or ±2 mm whichever is the greater
Et Kalınlığı Toleransı	Dış Çap≤219,1 mm ±%12,5 ya da 0,4 mm hangisi büyükse Dış Çap>219,1 mm ±%10 dan ±%20" e kadar	Tolerance of Wall thickness	OD≤219.1 mm ±12.5%or±0,4 mm whichever is the greater OD>219.1 mm from ±10% up to ±20% OD: Outer Diameter
Boru Boyu	- 6 ve 12 metre (19,69 ile 39,8ft) - 5 – 12 m (16,4 ile 39,8 ft arası) - İstedığınız boyda (özel üretim ise) - Tolerans : +100/-0mm (+3.94/-0 in)	Lengths	- 6 and 12 meters - 5-12m(16.4-39.8 ft) with respect to customer demand for special production - Tolerances: +100/-0mm (+3.94/-0 in)
Koruma	- Korumasız - Siyah Vernikli - İki ucu Plastik Tapalı	Protection	- Unprotected - External varnished with black or clear lacquer - the tubes is delivered with plastic caps at both ends
Markalama	Standardın gerektirdiği gibi ya da özel üretilenlerde müşteri talebine göre	Marking	According to standard or per customer request for special production
Sertifika	Genellikle EN 10204 3.1"e göredir. Özel üretimlerde sipariş esnasında belirtilir ise EN 10204 3.2 "ye göre verilebilir.	Certification	Mill test reports are issued to customer requirements. Usually they comply with EN 10204 3.1 (If it is wanted during order for special production then EN 10204 3.2 issued)

KAZAN VE EŞANJÖR BORULARI / BOILER AND HEAT EXCHANGER TUBES (YÜKSEK SICAKLIK) (HIGH TEMPERATURE)

DAMLA BORU

KİMYASAL VE FİZİKSEL ÖZELLİKLER CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

Çelik Grubu Steel Group	Kimyasal Kompozisyon (%) / Chemical composition (%)											Mekanik Özellikler / Mechanical Properties			
	C	Si	Mn	P max	S max	Cr	Mo	Ni	Diğer other	Akma Mukavemeti Yield Strength, min. N/mm ²	Çekme Mukavemeti Tensile Strength N/mm ²	Uzama Elongation Min.(%)	Impact J	(°C)	
Grade A	max. 0.25	min. 0.10	0.27-0.93	0.035	0.035					205	min. 330	35			
Grade B	max. 0.30	min. 0.10	0.29-1.06	0.035	0.035					240	min 415	30			
St35.8	max. 0.17	0.10-0.35	0.40-0.80	0.040	0.040					235	360-480	25			
St45.8	max. 0.21	0.10-0.35	0.40-1.20	0.040	0.040					255	410-530	21			
P195GH	max. 0.13	max. 0.35	max.0.70	0.025	0.020	max. 0.30	max. 0.08	max. 0.30		195	320-440	27	28	-10	
P235GH	max. 0.16	max. 0.35	max. 1.20	0.025	0.020	max. 0.30	max. 0.08	max. 0.30		225	360-500	25	28	-10	
P265GH	max. 0.20	max. 0.40	max. 1.40	0.025	0.020	max. 0.30	max. 0.08	max. 0.30		255	410-570	23	28	-10	
17Mn4	0.14-0.20	0.20-0.40	0.90-1.20	0.040	0.040	Max 0.30				270	460-580	23			
16Mo3	0.12-0.20	max. 0.35	0.40-0.90	0.025	0.020	max. 0.30	0.25-0.35	max. 0.30		270	450-600	22	40	20	
13CrMo4-5	0.10-0.17	max. 0.35	0.40-0.70	0.025	0.020	0.70 -1.15	0.40-0.60	max. 0.30		290	440-590	22	40	20	
10CrMo9-10	0.08-0.15	Max.0.50	0.40-0.70	0.035	0.035	2.00-2.50	0.90-1.20			280	450-600	20	40	20	
14MoV63	0.10-0.18	0.10-0.35	0.40-0.70	0.035	0.035	0.30-0.60	0.50-0.70		V 0.22-0.32	320	460-610	20			
ASTM A179	0.06-0.18	-	0.27-0.63	0.035	0.035					180	325	36	HRB = max 72		
Grade A-1	max. 0.27	min. 0.10	max. 0.93	0.035	0.035					255	415	30	HRB = max 79		
X10CrMoVNB9-1	0.08-0.12	0.20-0.50	0.30-0.60	0.020	0.010	8.00-9.50	0.85-1.05		Nb0.06-0.1	450	620	19	40	20	
P1, T1	0.10-0.20	0.10-0.50	0.30-0.80	0.025	0.025		0.44-0.65			205	380	30			
P9, T9	Max.0.15	0.25-1.00	0.30-0.60	0.025	0.025	8.00-10.00	0.45-0.65			205	415	30			
P11, T11	0.05-0.15	0.50-1.00	0.30-0.60	0.025	0.025	1.00-1.50	0.44-0.65	Max. 0.40		205	415	30			
P12, T12	0.50-0.15	Max.0.50	0.30-0.61	0.025	0.025	0.80-1.25	0.44-0.65			220	415	30			
P22, T22	0.05-0.15	Max.0.50	0.30-0.60	0.025	0.025	1.90-2.60	0.87-1.13			205	415	30	HRB=max85		
P5, T5	Max.0.15	Max.0.50	0.30-0.60	0.025	0.025	4.00-6.00	0.45-0.65			205	415	30			
P91, T91	0.08-0.12	0.20-0.50	0.30-0.60	0.020	0.010	8.00-9.50	0.85-1.05		V,Nb	415	585	20			