

**CLASS NORMU VANA MALZEMELERİ -1-
MATERIALS OF CLASS NORM VALVES**



**FERROUS CAST MATERIALS
ÇELİK DÖKÜM MALZEMELER**

**FERROUS WROUGHT MATERIALS
DÖVME ÇELİK MALZEMELER**

Material / Malzeme	304 SS	316 SS	ALLOY-20	CARBON STEEL	13 % Cr	304 SS	316 SS	410 SS
ASTM Specification	A 351 GR. CF8 A 296 GR. CF8	A 351 GR. CF8M A 296 GR. CF3M	A 351 GR. CN7M A 296 GR. CN7M	A 105 GR. II	A 182 GR. F 6a	A 182 GR. F 304	A 182 GR. F 316	A 276 GR. 410
Carbon / Karbon C max.	% 0.08	0.08	0.07	0.22 - 0.35	0.15	0.08	0.08	0.15
Manganese / Manganez Mn	% 1.5	1.5	1.5	0.60-1.05	1.00	2.00	2.00	1.00
Phosphorus / Fosfor P max.	% 0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulphur / Sülfür S max.	% 0.04	0.04	0.04	0.05	0.03	0.03	0.03	0.03
Silicon / Silikon Si max.	% 2.0	1.5	1.5	0.35	1.00	1.00	1.00	1.00
Chromium / Krom Cr max.	% 18.0-21.0	18.0-21.0	19.0 - 21.0		11.5-13.5 max.	18.0-20.0	16.0-18.0	11.5-13.5
Molybdenum / Molibden Mo	% -	2.0 - 3.0	2.0 - 3.0				2.00 - 3.00	
Nicel / Nikel Ni	% 8.0 - 11.0	9.0 - 12.0	27.5 - 30.5	-	0.5 max.	8.0 - 11.0	10.0 - 14.0	
OTHERS			Cu-3.0 to 4.0					
Tensile Strength MPA Min.	485	485	425	485	760	515	515	760
Yield Strength MPA Min.	205	205	170	250	585	205	205	585
Elongation in 2" % Min.	35	30	35	22	15	30	30	22
Reduction of area Min.	% -	-	-	30	35	50	50	35
Usage	Body / Gövde Bonnet / Kapak Wedge / Sürgü Yokes / Çatal Gln fln. / Gln flansı Seats / Burclar Disc / Klape	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape Seats / Burclar	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape Seats / Burclar	Gln fln. / Gln flansı Eye bolts / Halka civ. Seats / Burclar Body / Gövde Bonnet / Kapak	Stem / Mil Eye bolts / Halka civ. Seats / Burclar Wedge / Sürgü	Stem / Mil Eye bolts / Halka civ. Seats / Burclar Wedge / Sürgü	Stem / Mil Eye bolts / Halka civ. Seats / Burclar Wedge / Sürgü	Stem / Mil Eye bolts / Halka civ. Seats / Burclar Disc / Klape

MATERIAL COMPARISONS / MALZEME KARŞILAŞTIRMASI

GENERAL CLASSIFICATION	ASTM	BS	DIN	
Cast / Döküm	Carbon Steel/ Karbon Çeliği	A 216 - WCB	BS 1504 - 161B	17 245 - GS-C 25
Cast Alloy Steel Döküm Alaşım Çeliği	Carbon Mo Steel	A 217 - WC1	BS 1398 - a	17 245 - GS 22 Mo 4
	1 1/4 % Cr - Mo Steel	A 217 - WC6	BS 1398 - B	17 245 - GS 17 Cr Mo
	2 1/4 % Cr - Mo Steel	A 217 - WC9	BS 1398 - C	GS 12 Cr Mo9.10
	4 - 6 % Cr Steel	A 217 - C5	BS 1462	GS 12 Cr Mo19.5
Cast Austenitic Steel	18 - 8 CrNi	A 351 CF8	BS 1504 - 801	G-X6CrNi 18.9
	18 - 8 CrNi,Mo	A 351 CF8M	BS 1504 - 845	G-X5CrNiMo 18.10
Ferrous Wrought Mat.	Carbon Steel	A 105	BS 1503 - 161	17 200 C22N
	13 Cr	A 182 - F6	BS 1503 - 713	X 10 Cr 13
	18/8 Cr Ni	A 182 - F304	BS 1503 - 801	X 5 Cr Ni 18.9
	18/8 Cr Ni Mo	A 182 - F316	BS 1503 - 845B	X 5 Cr Ni Mo18.10
Bolting - Nut Cıvata/Somun	Cr Mo	A 197 - B7	BS 1750 - B7	17 200 42 CrMo4
	18/8 Cr Ni	A 193 - B8	BS 1750 - B8	X 5 Cr Ni 18.9
	Carbon Steel	A 307	BS 970.En3	267
		A 194 - 2H	BS 1750 - 2H	17 240 C45

CLASS NORMU VANA MALZEMELERİ -2-
MATERIALS OF CLASS NORM VALVES

MATERIAL / MALZEMELER
FERROUS CAST MATERIALS / ÇELİK DÖKÜM MALZEMELER

Material / Malzeme	Carbon Steel	Carbon Moly. Steel	1 1/4 %Cr-Mo Steel	2 1/4 % Cr Mo. Steel	4-6 % Cr Steel	13 % Cr Steel
ASTM Specification	A 216 GR. WCB	A 217 GR. WC1	A 217 GR. WC6	A 217 GR. WC9	A 217 GR. C5	A 351 GR. CA 15
Carbon / Karbon C max.	% 0.30	0.25	0.20	0.18	0.20	0.15
Manganese / Manganez Mn	% 1.0 Max	0.50-0.80	0.50-0.80	0.40-0.70	0.40-0.70	1.0
Phosphorus / Fosfor P max.	% 0.04	0.04	0.04	0.04	0.04	0.04
Sulphur / Sülfür S max.	% 0.045	0.045	0.045	0.045	0.045	0.04
Silicon / Silikon Si max	% 0.60	0.60	0.60	0.60	0.75	1.5
Cromium / Krom Cr max.	% -	-	1.0-1.5	2.0-2.75	4.0-6.5	11.5-14.0
Molybdenum / Molibden Mo	% -	0.45-0.65	0.45-0.65	0.9-1.2	0.45-0.65	-
Nicel / Nikel Ni	% -	-	-	-	-	1.0 Max.
Tensile Strength MPA Min.	485 - 655	450 - 620	485 - 655	485 - 655	620 - 795	620 - 795
Yield Strength MPA Min.	250	240	275	275	415	450
Elongation in 2" Min.	22	24	20	20	18	18
Reduction of area Min.	% 35	35	35	35	35	30
Usage	Body / Gövde Bonnet / Kapak Wedge / Sürgü Yokes / Çatal Gln fln. / Gln flanşı Disc / Klape	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape	Body / Gövde Bonnet / Kapak Wedge / Sürgü Disc / Klape Seats / Burclar

FOR TRIMMING MATERIALS / MİL MALZEMELERİ
Chemical Properties / Kimyasal Analizler

ASTM Std. Grade	13 Cr AISI 410	13 Cr AISI 420	18Cr-8Ni F-304	18Cr-8Ni-2Mo A-182 F-316	13 Cr A-182 F6
Carbon / Karbon C % Max.	0.15	0.15 min.	0.08	0.08	0.15
Silicon / Silikon Si % Max.	1.00	1.00	1.00	1.00	1.00
Manganese / Manganez Mn % Max.	1.00	1.00	2.00	2.00	1.00
Phosphorus / Fosfor P % Max.	0.040	0.040	0.040	0.040	0.040
Sulphur / Sülfür S % Max.	0.030	0.030	0.030	0.030	0.030
Nicel / Nikel Ni %	-	-	8.0 - 11.0	10.0 - 14.0	0.50 max.
Cromium / Krom Cr %	11.50 - 13.50	12.00 - 14.00	18.0 - 20.0	16.0 - 18.0	11.5 - 13.5
Molybdenum / Molibden Mo %	-	-	-	2.0 - 3.0	-
Copper / Bakır Cu %	-	-	-	-	-
Iron / Demir Fe %	Bal.	Bal.	Bal.	Bal.	Bal.
Titan / Titan Ti %	-	-	-	-	-

BOLTING FOR BODY BONNET / KAPAK BAĞLANTI CIVATALARI

Material/ Malzeme	Carbon Steel Karbon Çeliği	Alloy Steel Alaşım Çeliği	Alloy Steel Alaşım Çeliği	Stainless Steel Paslanmaz Çelik	Stainless Steel Paslanmaz Çelik
ASTM Specification	A 307 GR. B	A 193 GR. B7	A 193 GR. B16	A 193 GR. B8	A 193 GR. B8M
Tensile Strength MPA Min.	415	860	860	515	515
Yield Strength MPA Min.	-	720	720	205	205
Elongation in 2" Min.	18	16	18	30	30
Reduction of area % Min.	-	50	50	50	50

NUTS MATERIALS / SOMUN MALZEMELERİ

ASTM A Specification	A 194 Gr. 2H	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 8	A 194 Gr. 8M