

FERROUS CAST MATERIALS

FERROUS WROUGHT MATERIALS

Material		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 C max.	%	0.08	0.08	0.07	0.22 - 0.35	0.15	0.08	0.08	0.15
Manganese Mn	%	1.5	1.5	1.5	0.60-1.05	1.00	2.00	2.00	1.00
Phosphorus P max.	%	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Sulphur S max.	%	0.04	0.04	0.04	0.05	0.03	0.03	0.03	0.03
Silicon Si max.	%	2.0	1.5	1.5	0.35	1.00	1.00	1.00	1.00
Cromium 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 Mo	%	-	2.0 - 3.0	2.0 - 3.0				2.00 - 3.00	
Nicel	%	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	Body	Body	Gln fln.	Stem	Stem	Stem	Stem
		Bonnet	Bonnet	Bonnet	Eye bolts	Eye bolts	Eye bolts	Eye bolts	Eye bolts
		Wedge	Wedge	Wedge	Seats	Seats	Seats	Seats	Seats
		Yokes	Disc	Disc	Body	Wedge	Wedge	Wedge	Disc
		Gln fln	Seats	Seats	Bonnet				
		Seats							
		Disc							

MATERIAL COMPARISONS / MALZEME KARŞILAŞTIRMASI

GENERAL CLASSIFICATION		ASTM	BS	DIN
Cast	Carbon Steel	A 216 - WCB	BS 1504 - 161B	17 245 - GS-C 25
Cast Alloy Steel	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	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

MATERIAL FERROUS CAST MATERIALS

Material			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	C max.	%	0.30	0.25	0.20	0.18	0.20	0.15
Manganese	Mn	%	1.0 Max	0.50-0.80	0.50-0.80	0.40-0.70	0.40-0.70	1.0
Phosphorus	P max.	%	0.04	0.04	0.04	0.04	0.04	0.04
Sulphur	S max.	%	0.045	0.045	0.045	0.045	0.045	0.04
Silicon	Si max.	%	0.60	0.60	0.60	0.60	0.75	1.5
Cromium	Cr max.	%	-	-	1.0-1.5	2.0-2.75	4.0-6.5	11.5-14.0
Molybdenum	Mo	%	-	0.45-0.65	0.45-0.65	0.9-1.2	0.45-0.65	-
Nicel	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	Body	Body	Body	Body	Body
			Bonnet	Bonnet	Bonnet	Bonnet	Bonnet	Bonnet
			Wedge	Wedge	Wedge	Wedge	Wedge	Wedge
			Yokes	Disc	Disc	Disc	Disc	Disc
			Gln fln.					Seats
			Disc					

FOR TRIMING MATERIALS Chemical Properties

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

BOLTING FOR BODY BONNET

Material	Carbon Steel	Alloy Steel	Alloy Steel	Stainless Steel	Stainless Steel
ASTM Specification	A 307 GR. B	A 193 GR. B7	A 193 GR. B16	A 193 GR. B8	A 193 GR. B8M
Tensile Stregh 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

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