



# FERROUS METALS

## Carbon and Low Alloy Steels

SPECIFICATION	GRADE	TYPE OF STEEL	AFNOR	DIN	WERKSTOFF	AISI	AMS	BS3100:1976	BS970:1972	EN	UTS		EI	IZOD	HARDNESS		CHARACTERISTICS AND TYPICAL APPLICATIONS
											N/mm <sup>2</sup> Min	Max			%	Ft lbs	
CLA 1	A B C	Carbon Steels	C20d C30d C40d	GS 45 GS52 GS60	10443 10551 10553	C1020/1/2/3 C1030 C1040		A1 A2 A3	050A22 060A32 060A42	3 5 8	430 500 540	- - -	15 13 11	- - -	174 183 163	207	Plain carbon steels with a range of tensile properties (via heat-treatment) with good ductility for low and medium strength applications eg brackets, housings, links
CLA 2		1½% Min Steel	20 MNC 6	20 Mn 6	15060	C1027		A4	150M19	14A	550 0	70	13	30	152	201	Superior properties to plain carbon steel medium strength applications where degree of shock resistance required eg links, levers.
CLA 3		145-55 ton 700-850N/mm <sup>2</sup> Alloy Steel	40 NCD 6	34 Cr Ni Mo 6	16582	9840		BT1	816M40	24	700	850	11	25	201	255	A range of tensile strengths possible with good ductility and shock resistance. Readily machineable. Medium and high strength applications where ductility shock and fatigue strength required eg brackets, levers, airframe parts, hydraulic machinery.
CLA 4		155-65 ton 850-1000N/mm <sup>2</sup> Alloy Steel	32 NCD 10	30 Cr Ni Mo 8	16580	4337	5328	BT2	823M30	25	1000		11	15	248	302	
CLA 5	A B	High Tensile Steels	40 NCD 10						826M31(Z)		1000 1160	- -	9 5	30 10	321 341	388	
CLA 7		3% Cr Mo Steel	20 CD 12	24 Cr Amo 10	17273			B4	722M24	29	620	770	14	25	179	223	Medium strength, good ductility and resistance to thermal shock. Useful corrosion and creep resistance for parts operating up to 400°C.
CLA 8		Carbon Steel Surface Hardening	C40d	Ck 45	11191	C1040		AW2	060A40	8	540	-	15	-	-	-	Local or surface hardening to minimum 500HV but retaining good core strength. Pawls, ratchets, triggers.
CLA 9		Carbon Steel Case Hardening	C14d	Ck 15	11141	C1060		AW1	080A15	32	495	-	15	20	-	-	Low carbon case hardening for carburising or cyanide treatment. Low tensile core gives good shock resistance. Ratchets, operating levers.
CLA 10		3% Ni Case Hardening Steel	12 N 12	10 Ni 14	15637					33	700	-	14	30	-	-	Carburising or cyanide hardening with tough core and reasonable shock resistance. Reciprocating or intermittent loading—high speed connecting links and levers.
CLA 11		3% Cr Mo Nitriding Steel	20 CD 12	27 Cr Mo 13.5	17365			B4	722M24	40	850	1000	8	15	248	302	Nitride hardening to 900HV retaining high strength core, good ductility and shock resistance. Moving parts with wear resistance—crank pins and shafts, sewing machine loopers.
CLA 12	A B C	1% Cr Abrasion Resisting Steel	50 C5 50 C5 60 CD 5	50 Cr Mo 4 50 Cr Mo 4 60 Cr Mo 4	17228 17228 17229	5147 5147 4150		BW2 BW3 BW4			- 700 700	- - 700	8 8 8	- - -	- - 341	-	Steels with capability of good through hardness and wear resistance. Grades B and C suitable for heavy duty conditions.
CLA13		Ni Mo Steel	18 ND 7			4617			665H17	34	700	-	14	30	-	-	Case carburising, medium strength core and reasonable shock resistance. Alternative to CLA 10.

This list gives details of the main alloys cast but we would be pleased to discuss any other materials required. As this is intended to be a guide only, the full relevant standard specifications should be referred to when determining suitable materials for a particular product and its application.