

EN36A Case hardening steel

Typical Analysis (Ave. values %)	C	Si	Mn	Ni	Cr	Mo	S	P	
	0.13	0.20	0.45	3.50	0.80	-	0.025	0.025	
NEAREST STANDARD	AS		DIN		BS 970		AISI		
	X3312		1.5752 14NiCr14		655 M 13 EN36A		E9315		

DESCRIPTION	Chromium, Nickel Case Hardening steel for applications requiring excellent wear surface and high toughness and core strength. In particular medium to large cross sections.
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APPLICATIONS	Highly stressed large and medium components for Motor vehicle and general engineering purposes where surface hardness combined with good core strength is required, eg. Gear wheels, King pins, Crankshafts and Gear shafts.
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HEAT TREATMENT	Forge	850-1050°C. Cool in furnace.
	Normalize	850-880°C. Air cool.
	Anneal	650-700°C. Cool slowly in controlled furnace.
	Carburize	900-950°C. Furnace or Air cool
	Core Refine	850-880°C. Oil quench or Air cool.
	Harden	760-780°C Oil quench.
	Temper	180-210°C air cool
	Annealed hardness	229 HB max.

WELDING	Parts should be welded before Carburizing and Hardening. Preheat to 250-350°C. Filler metals:-Bohler FOX DCMS-KB or FOX 2.5 Ni electrodes. DCMS-IG wire.
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MECHANICAL PROPERTIES Blank Carburized	Diameter	Tensile Strength MPa	Yield Strength MPa	Elong %	Red. of Area %
	11	980-1280	785	8	35
	30	880-1180	765	9	40
	63	780-1080	635	10	40

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PHYSICAL PROPERTIES	Density (kg/dm ³)	7.85				
	Modulus of elasticity 10 ³ N/mm ²	210				
	Thermal conductivity W/(m.K)	34				
	Electric resistivity Ohm.mm ² /m	0.20				
	Specific heat capacity J/(kg.K)	460				
	Modulus of elasticity 10 ³ N/mm ²	100°C	200°C	300°C	400°C	500°C
		205	195	185	175	165
Thermal expansion 10 ⁶ m/(m.K)	100°C	200°C	300°C	400°C	500°C	
	11.1	12.9	12.9	13.5	13.9	

SIZE RANGE	Round	6.35-450 mm				
	Square	30-300 mm				
	Flat	25x12 to 600x250 mm				

Notes

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