

## 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		

<b>DESCRIPTION</b>	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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<b>APPLICATIONS</b>	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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<b>HEAT TREATMENT</b>	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.

<b>WELDING</b>	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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<b>MECHANICAL PROPERTIES</b> 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

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

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

### **LOCATIONS**

#### **Bohler Uddeholm Australia Pty Ltd ABN 15000013052**

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Marayong	1/21 Binney Rd Marayong	2148	Ph (02) 9831 4431	Fax (02) 9671 1682
Melbourne	282-290 Greens Rd Dandenong	3175	Ph (03) 9767 5554	Fax (03) 9767 5555
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Adelaide	1 Williams Cir Pooraka	5095	Ph (08) 8368 4554	Fax (08) 8368 4555
Brisbane	12-18 Limestone St Darra	4076	Ph (07) 3712 9554	Fax (07) 3712 9555
Townsville	9-11 Caldwell St Garbutt	4814	Ph (07) 4479 4800	Fax (07) 4725 1316
Perth	29-33 Gauge Cir Canningvale	6155	Ph (08) 9455 8672	Fax (08) 9455 8673
Kewdale	5 Beete St Welshpool	6106	Ph (08) 9350 9582	Fax (08) 9350 9683
Launceston	20 Murphy St Invermay	7248	Ph (03) 6334 3542	Fax (03) 6331 4001

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### Notes