

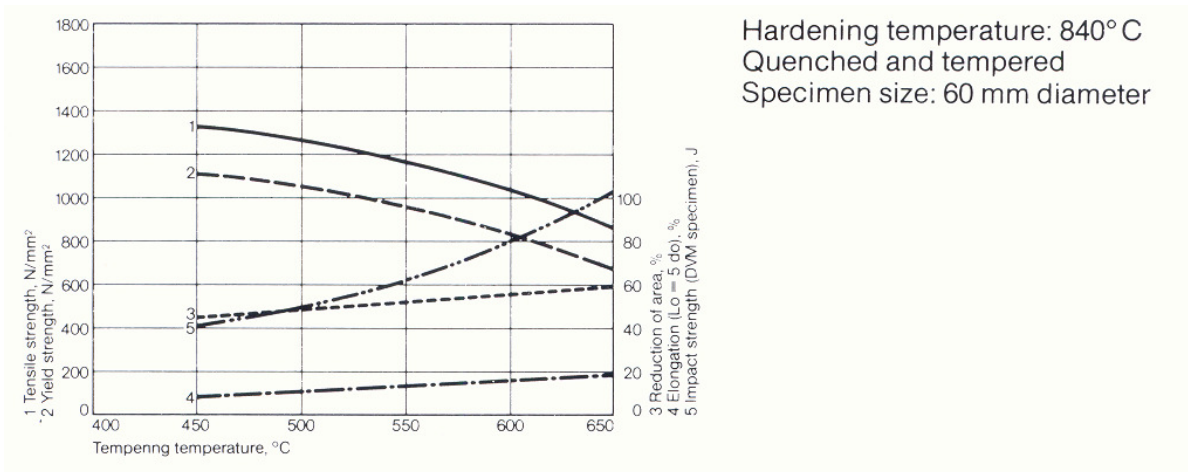
# 4340 High tensile steel

Typical Analysis (Ave. values %)	C	Si	Mn	Ni	Cr	Mo	S	P	
	0.40	0.25	0.70	1.80	0.80	0.25	0.025	0.025	
NEAREST STANDARD	AS		DIN		BS		AISI		
	4340		1.6565 34CrNiMo6		~En24 ~ 817 M 40		4340		

<b>DESCRIPTION</b>	Nickel, Chromium, Molybdenum steel for applications requiring high tensile strength and toughness values, particularly in large cross sections in the quenched and tempered condition. The addition of Molybdenum prevents the steel from being susceptible to temper brittleness. Higher tensile and yield strength than 4140.
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<b>APPLICATIONS</b>	Components for the aircraft, automotive and general engineering industries eg. Propeller shafts, connecting rods, gear shafts, and other automobile parts. Heavy forgings, eg. Rotors, shafts, discs.
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<b>HEAT TREATMENT</b>	Forge	850-1050°C, slow furnace cool.
	Normalize	850-880, air cool.
	Anneal	650-700, Cool slowly in controlled furnace
	Stress relieve	In the quenched and tempered condition, about 30-50°C below the tempering temperature. Air cool. In the annealed condition, 600-650°C. Air cool.
	Harden	830-860°C, oil quench
	Temper	540-680°C hold for 1 hour min. at temperature, air cool. (see tempering chart)
	Nitride	Suitable for both liquid and gas nitriding.



<b>WELDING</b>	<p>Parts should be welded in the hardened and tempered condition. Strength properties of the joint will not be the same as the base metal.</p> <p>Preheat 300-400°C. Temper after welding to about 35-50°C below the recommended tempering temperature.</p> <p>Filler metal: - Fox DCMS-KB electrodes or DCMS-IG wire.</p> <p>For advice in connection with difficult welding, please consult our engineers.</p>
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<b>MECHANICAL PROPERTIES</b> Heat Treated Condition		10 – 250 mm dia	251 above <b>Aim</b>
	Yield strength ( Rp 0.2)	Min 700 N/mm <sup>2</sup>	Min 630 N/mm <sup>2</sup>
	Tensile (Rm)	900 – 1100 N/mm <sup>2</sup>	850 – 1000..N/mm <sup>2</sup>
	Elongation (A5) %	Min 12	To be recorded
	Charpy Impact J	Min 42	To be recorded
	Hardness	275 – 335 HB	To be recorded
	Z% RA	To be recorded	To be recorded
	<b><u>Note Test piece to be taken 12.5 mm from the surface.</u></b>		

<b>HIGH TEMPERATURE STRENGTH</b>	For quenched and tempered heavy forgings.								
	Diameter		Yield strength MPa						
	Over	Up to	20°C	100°C	200°C	250°C	300°C	350°C	400°C
		250	590	549	510	481	441	412	371
	250	500	540	505	471	451	412	383	353
	500	1000	490	466	441	422	392	363	343

<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)	42				
	Electric resistivity Ohm.mm <sup>2</sup> /m	0.19				
	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		12.1	12.9	13.5	13.9	

Round Black										
<b>SIZE RANGE</b>	17	38	60	85	115	160	220	280	325	380
	20	40	63	90	120	165	225	285	330	385
	25	42	65	95	125	170	230	290	340	390
	28	45	70	97	130	180	240	300	350	400
	30	50	75	100	140	190	250	305	360	410
	32	55	76	105	150	200	260	310	365	460
	35	57	80	110	155	210	270	320	370	
Round peeled k12 Forged sizes +2-4mm										
<b>SIZE RANGE</b>	51	110	140	185	230	270	305	370		
	82	120	150	190	240	280	310	385		
	85	130	160	200	250	285	330	410		
	105	136	180	210	260	300	360			

Sizes normally stocked in Australia. Some branches may not hold the entire range.  
 Other sizes available on request.

<b><u>LOCATIONS</u></b>					
<b>Bohler Uddeholm Australia Pty Ltd ABN 15000013052</b>					
Sydney	129-135 McCredie Rd Guildford	2161	Ph (02) 8724 5554	Fax (02) 8724 5555	
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Albury	1 Eames St Albury	2640	Ph (02) 6041 3399	Fax (02) 6041 1820	
Wollongong	40 Doyle Ave Unanderra	2526	Ph (02) 4272 6544	Fax (02) 4272 7563	
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	
Bayswater	4 Ramage St Bayswater	3153	Ph (03) 9729 7356	Fax (03) 9738 0850	
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Brisbane	12-18 Limestone St Darra	4076	Ph (07) 3712 9554	Fax (07) 3712 9555	
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Launceston	20 Murphy St Invermay	7248	Ph (03) 6334 3542	Fax (03) 6331 4001	
<a href="http://www.buau.com.au">www.buau.com.au</a>					
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