

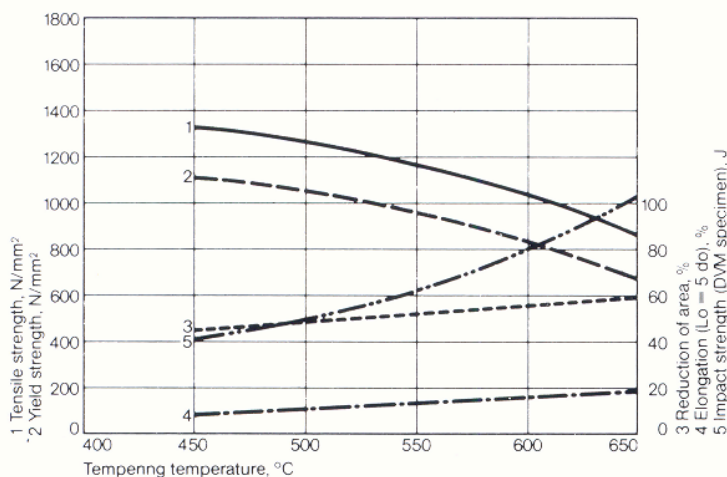
4340 High tensile steel

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		

DESCRIPTION	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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APPLICATIONS	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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HEAT TREATMENT	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.



Hardening temperature: 840°C
Quenched and tempered
Specimen size: 60 mm diameter

WELDING	<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. Preheat 300-400°C. Temper after welding to about 35-50°C below the recommended tempering temperature. Filler metal: - Fox DCMS-KB electrodes or DCMS-IG wire. For advice in connection with difficult welding, please consult our engineers.</p>
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MECHANICAL PROPERTIES Heat Treated Condition	Condition	Ruling section mm	Tensile Strength MPa	Yield Strength MPa	Elong. %	Izod Impact J	Brinell Hardness
	T	250	850-1000	635	13	40	248-302
	T	150	850-1000	665	13	54	248-302
	U	100	930-1080	740	12	47	269-331
	V	63	1000-1150	835	12	47	293-352
	W	30	1080-1230	925	11	41	311-375
	X	30	1150-1300	1005	10	34	341-401
	Y	30	1230-1380	1080	10	24	363-429
	Z	30	1555-	1125	5	10	444-

HIGH TEMPERATURE STRENGTH	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	

PHYSICAL PROPERTIES	Density (kg/dm ³)	7.85				
	Modulus of elasticity 10 ³ N/mm ²	210				
	Thermal conductivity W/(m.K)	42				
	Electric resistivity Ohm.mm ² /m	0.19				
	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		12.1	12.9	13.5	13.9	

SIZE RANGE	Standard stock condition "U" (Refer to mechanical properties)	
	Round	9 to 410 mm
	Square	16 mm
	Flat	76.2 x 50.8 mm

LOCATIONS				
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