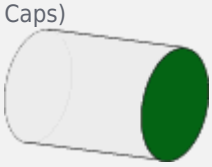
ENGINEERING STEELS + ALLOYS

4140 HARD CHROME PLATED BAR

4140 is a 1% Chromium - Molybdenum high tensile steel supplied in the hardened and tempered, cold drawn or turned, precision ground, polished, chrome plated and final polished condition, with a typical base metal tensile strength of 850 - 1000 Mpa, plus a typical hard chrome plated surface hardness of HV 1000 - 1150.
Characterised by an extremely smooth surface finish with excellent wear and corrosion resistance, coupled with a base material giving high strength and good impact properties, plus good machinability.
4140 hard chrome plated bar is used extensively by the hydraulic and pneumatic industries, and is employed by other industry sectors for a wide range of applications requiring higher strength.
Typical applications are: Agricultural Equipment, Hydraulic Cylinders, Hoists, Jacks and other Lifting equipment, Machine Tools, Mining and Earth Moving Equipment, Pumps, Valves, Waste Disposal Transport and Equipment etc.

Colour Code	Stocked Sizes	
Dark Green (End Caps) 	Metric	20 mm - 140 mm Dia
	Imperial	7/8" - 5" Dia

Related Specifications	
Australia	AS 1444 - 1996 4140
Germany	W.Nr 1.7223 41CrMo4 W.Nr 1.7225 42CrMo4
Great Britain	BS970 - Part 3 - 1991 709M40 BS970 - 1955 EN19A
Japan	JIS G 4105 SCM 440
USA	ASTM A29/A29M - 91 4140 SAE/AISI 4140 UNS G41400

Chemical Composition (Base Material)		
	Min. %	**Max %**
Carbon	0.36	0.44
Silicon	0.10	0.40
Manganese	0.65	1.10
Chromium	0.75	1.20
Molybdenum	0.15	0.35
Phosphorous	0	0.04
Sulphur	0	0.04

Typical (Base Metal) Mechanical Properties - As Supplied Condition	
Manufacturing Process	Turned
Tensile Strength Mpa	900
Yield Strength Mpa	800

Elongation In 50mm %	20
Hardness Brinell HB	270
Typical Properties Induction Hardened Case	
Thickness	3.2mm
Hardness	Rc 55-65
Hard Chrome Plating	
Typical Surface Hardness	HV 1000 - 1150
Typical Surface Smoothness	0.10 - 0.30 umRa (Microns)
Typical Surface Deposit*	0.025 - 0.050mm (0.001") - (0.002")
*Note: Can be supplied up to 0.125 mm against order, subject to minimum quantity requirements.	

Diameter and Straightness Tolerance

Diameter	mm	Up to 51mm Dia		Over 51 - 102mm Dia		Over 102mm Dia		Straightness
	Inches	Up to 2.0		Over 2.0 - 4.0		Over 4.0		Below 50mm 0.25mm/1000mm Over 50mm 0.30mm/1000mm
Tolerance	mm	+0.00	-0.025	+0.00	-0.050	+0.00	-0.075	
	Inches	+0.00	-0.001	+0.00	-0.002	+0.00	-0.003	

Typical Bar Lengths	
Up to 18mm Dia	2000mm - 3600mm
19.05mm to 25mm Dia	4000mm
Over 25mm Dia	6000mm
Bar lengths are approximates only. NB. Bars have 100mm approx. unchromed surface at each end.	
Packaging	
Supplied in cardboard tubes for protection.	
Machining	
4140 hard chrome plated bar has very good machinability, similar to 4140 uncoated bar. Machining however should commence beneath the chrome plating, or at the unchromed surface at the end of the bar. To protect the polished chrome surface, soft materials such as copper, aluminium or mild steel should be used as clamping materials and any particles of hard chrome should be removed immediately to avoid scratching. Otherwise all machining operations may be carried out satisfactorily.	
Welding	
Welding 4140 hard chrome bar in the hardened and tempered as supplied condition is not recommended and should be avoided if at all possible, as the mechanical properties will be altered within the weld heat affected zone. If however welding is really necessary the following procedure may be taken as a guide only..	
Welding Procedure	
The cardboard tube protecting the chrome plating should first be removed from the heat affected area otherwise it can cause some corrosion of the plating due to fumes emitted.Welding should always be carried out using low hydrogen electrodes. Please consult your welding consumables supplier.	

Suggested pre-heat temperature

Section	25mm	50mm	75mm	150mm +
°C	370	425	460	510

Post Welding
Maximum cooling rate 95 °C per hour down to 95 °C, followed by cooling in still air. NB. No draught. It is recommended that the weld area if possible is wrapped in a heat resistant blanket or buried in sand, dry lime etc.