


## 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)<br> | Metric        | 20 mm - 140 mm Dia |
|   | Imperial      | 7/8" - 5" Dia      |

### Related Specifications

|               |  |
|---------------|--|
| Australia     | AS 1444 - 1996 4140                                    |
| Germany       | W.Nr 1.7223 41CrMo4<br>W.Nr 1.7225 42CrMo4             |
| Great Britain | BS970 - Part 3 - 1991 709M40<br>BS970 - 1955 EN19A     |
| Japan         | JIS G 4105 SCM 440                                     |
| USA           | ASTM A29/A29M - 91 4140<br>SAE/AISI 4140<br>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                                 |                |        |                     |        |                |        |   |
| <b>Typical Properties Induction Hardened Case</b>   |                                     |                |        |                     |        |                |        |   |
| Thickness   | 3.2mm                               |                |        |                     |        |                |        |   |
| Hardness  | Rc 55-65                            |                |        |                     |        |                |        |   |
| <b>Hard Chrome Plating</b>  |                                     |                |        |                     |        |                |        |   |
| 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.  |                                     |                |        |                     |        |                |        |   |
| <b>Diameter and Straightness Tolerance</b>  |                                     |                |        |                     |        |                |        |   |
| 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       |        |   |
| Tolerance   | mm                                  | +0.00          | -0.025 | +0.00               | -0.050 | +0.00          | -0.075 | Below 50mm<br>0.25mm/1000mm<br>Over 50mm<br>0.30mm/1000mm |
|   | Inches                              | +0.00          | -0.001 | +0.00               | -0.002 | +0.00          | -0.003 |   |
| <b>Typical Bar Lengths</b>  |                                     |                |        |                     |        |                |        |   |
| Up to 18mm Dia  | 2000mm - 3600mm                     |                |        |                     |        |                |        |   |
| 19.05mm to 25mm Dia   | 4000mm                              |                |        |                     |        |                |        |   |
| Over 25mm Dia   | 6000mm                              |                |        |                     |        |                |        |   |
| Bar lengths are approximates only.<br>NB. Bars have 100mm approx. unchromed surface at each end.  |                                     |                |        |                     |        |                |        |   |
| <b>Packaging</b>  |                                     |                |        |                     |        |                |        |   |
| Supplied in cardboard tubes for protection.   |                                     |                |        |                     |        |                |        |   |
| <b>Machining</b>  |                                     |                |        |                     |        |                |        |   |
| 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. |                                     |                |        |                     |        |                |        |   |
| <b>Welding</b>  |                                     |                |        |                     |        |                |        |   |
| 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..   |                                     |                |        |                     |        |                |        |   |
| <b>Welding Procedure</b>  |                                     |                |        |                     |        |                |        |   |
| 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.<br>Please consult your welding consumables supplier.  |                                     |                |        |                     |        |                |        |   |
| <b>Suggested pre-heat temperature</b>   |                                     |                |        |                     |        |                |        |   |
| Section   | 25mm                                | 50mm           | 75mm   | 150mm +             |        |                |        |   |
| °C  | 370                                 | 425            | 460    | 510                 |        |                |        |   |
| <b>Post Welding</b>   |                                     |                |        |                     |        |                |        |   |
| 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.   |                                     |                |        |                     |        |                |        |   |

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