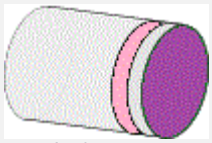
ENGINEERING STEELS + ALLOYS

# 12L14 BRIGHT MILD STEEL

12L14 is a Re-Sulphurised, Re-Phosphorised Free Maching Steel. This is premium grade of free cutting steel is used by repitition engineers and general machining for a wide variety of applicaitons. It has excellent machinability and is suitable for case hardening and electroplating.
Typical applications are: Brake hose ends, pulleys, disc brake pistons, wheel nuts and inserts, control linkages, gear box components (case hardened), domestic garbage bin axles, concrete anchors, padlock shackles, hydraulic fittings, vice jaws (case hardened)
Material: Magnetic in all conditions

| Colour Code | Stocked Sizes | |
|---|---|---|
|  Purple (Bar End)Rose Pink (Band) | Rounds | 6.35mm - 60mm |
| | Hexagons | 10mm - 63.5mm |
| | Bar Finish | Peeled, Cold Drawn, TurnedTurned & Polished, Centreless Ground |

| **Related Specifications** | |
|---|---|
| Australia | AS 1443/ 12L14, AS 1443/D13*, AS1443/T13* **Mechanical Test* |
| Germany | DIN 95MnPb28, Werkstoff No. 1.0718 |
| Great Britain | BS970 230M07 leaded, EN1A Leaded |
| Japan | JIS: SUM22L |
| USA | AISI /SAE 12L14 UNS G12144 |

| **Chemical Composition** | | |
|---|---|---|
| | **Min. %** | **Max. %** |
| Carbon | 0 | 0.15 |
| Silicon | 0 | 0.10 |
| Manganese | 0.80 | 1.20 |
| Phosphorous | 0.04 | 0.09 |
| Sulphur | 0.25 | 0.35 |
| Lead | 0.15 | 0.35 |

| **Typical Mechanical Properties - Cold Drawn and Turned and Polished Condition** | | | | | |
|---|---|---|---|---|---|
| Cold Drawn Size mm | | up to 16mm | 17 - 38mm | 39 - 63mm | Turned & Polished (all sizes) |
| Tensile Strength Mpa | Min | 480 | 430 | 400 | 370 |
| | Max | 760 | 690 | 630 | 520 |
| Yield Strength Mpa | Min | 350 | 330 | 290 | 230 |
| | Max | 590 | 550 | 500 | 310 |
| Elongation in 50mm % | Min | 7 | 8 | 9 | 17 |
| Hardness HB | Min | 142 | 120 | 115 | 105 |
| | Max | 225 | 205 | 185 | 155 |

**Forging**

| |
|---|
| Heat to 1300 °C maximum, hold until temperature is uniform throughout the section and commence forging.Do not forge below 950 °C<br>Finished forgings may be air cooled. |
| **Heat Treatment** |
| **Annealing** |
| Heat to 890 °C - 920 °C hold until temperature is uniform throughout the section, and cool in furnace. |
| **Carburizing** |
| Pack, salt or gas carburise at 900 °C holding for sufficient time to develop the required case depth and carbon content, followed by a suitable refining/hardening and tempering cycle to optimise case and core properties. |
| **Core Refine** |
| Slow cool from carburising temperature and re-heat to 880 °C - 900 °C, hold until temperature is uniform throughout the section and quench as required in oil, water. |
| **Case Hardening** |
| Following core refining, re-heat to 760 °C - 790 °C, hold until temperature is uniform throughout the section and quench in water.Temper immediately while still hand warm. |
| **Tempering - After Carburising, Core Refining and Case Hardening** |
| Re-heat to 120 °C - 230 °C, hold until temperature is uniform throughout the section, soak for 1 hour per 25 mm of section and cool in still air.NB. Tempering will improve the toughness of the case with only slight reduction in case hardness. It will also reduce it's susceptibility to grinding cracks. |
| **Normalizing** |
| Heat to 900 °C - 940 °C hold until temperature is uniform throughout the section, soak for 10 - 15 minutes.Cool in still air. |
| **Stress Relieving** |
| Heat to 500 °C - 700 °C hold until temperature is uniform throughout the section, soak for 1 hour per 25mm of section, and cool in still air. |
| **Notes on Heat Treatment** |
| Heating temperatures, rate of heating, cooling and soaking times will vary due to factors such as work piece size/shape, also furnace type employed, quenching medium and work piece transfer facilities etc.Please consult your heat treater for best results. |
| **Machining** |
| 12L14 is a premium free cutting steel grade suitable for all types of high production and repitition machining. |
| **Welding** |
| 12L14 is not recommended for welding due to its lead content. It is a health hazard |