GUIDE TO SELECTION

HOT ROLLED CARBON STEEL BARS

MERCHANT BAR QUALITY (MBQ)

Only a minimum discard is made from each ingot, but bars should be free from visible piping. Seams and other surface irregularities may be present. Chemistry is subjected to ladle analysis only. Easily machined, welded and formed but not suitable for applications involving forging, heat treating, cold drawing or other operations where internal soundness or freedom from detrimental surface imperfections is of prime importance. Conforms to ASTM A575.

SPECIAL BAR QUALITY (SBQ)

Manufactured under additional controls in rolling and surface preparation. Sufficient discard is made from each ingot to avoid injurious piping. To minimize surface imperfections, blooms and billets are carefully inspected and prepared by chipping, scarfing, and grinding prior to rolling into bars. Chemistry is subject to ladle and product analyses. This quality is more desirable when more exact requirements exist for machining and heat treatment. Conforms to ASTM A576.

In addition, Ryerson further assures the quality of the steel bars by having them produced to explicit specifications, designed to promote superior and more uniform characteristics.

COLD FINISHED CARBON STEEL BARS

These are general and special purpose steels widely used for a variety of job requirements. Choose from low cost, versatile 1018 . . . up to 1117, 1141 all produced to explicit Ryerson Tull specifications for controlled chemistry, to assure greater internal soundness, cleanliness, improved hardening qualities and better machinability.

For maximum machinability, choose from our screw stock — including 12L14, 12L14+Te, 1214Bi and 1215, or if greater strength is required select from our medium carbon, direct hardening steels. And if extreme size accuracy, straightness and concentricity are required, see our listings of ground and polished shafting stock.

LOW CARBON — CASE HARDENING

(For other case hardening steels, refer to the Alloy section.)

A36 (HR) — Bars designed for use in structural applications. Minimum mechanical properties of 36 KSI yield strength and 58 to 80 KSI tensile strength. Conforms to ASTM A36.

1018, 1020 (HR, CF) — A low carbon steel with a medium manganese content. Has good case hardening properties, fair machinability. Readily brazed and welded. Suitable for shafting and for applications that do not require the greater strength of high carbon and alloy steels. CF conforms to ASTM A108, HR conforms to A576.

1117 (HR, CF) — A low carbon, high manganese steel. Machinability is greatly improved over 1018, and case hardening is deep and uniform, supported by a tough ductile core. Withstands bending, broaching, and most deforming without cracking. CF conforms to ASTM A108, HR to A576.

11L17 (HR, CF) — The addition of .15 to .35% lead to the 1117 analysis provides for even faster machining without changing the excellent case hardening characteristics. CF conforms to ASTM A108, HR to A576.

M1020 (HR) — A low carbon, general purpose, merchant quality steel, produced to wider carbon and manganese ranges than standard steels. Suitable for forming and welding.

MEDIUM CARBON — DIRECT HARDENING

1035 (HR) — An intermediate carbon, special quality machinery steel, higher in strength and hardness than low carbon steel. Used for studs, bolts, etc.

1040, 1045 (HR, CF) — Medium carbon steels used when greater strength and hardness is desired in the as-rolled condition. Can be hammer forged and responds to heat treatment. Suitable for flame and induction hardening. Uses include gears, shafts, axles, bolts and studs, machine parts, etc.

M1044 (HR) — Merchant quality steel is similar to SAE 1045, but less costly. Contains lesser amounts of manganese (.25/.60); strength and responsiveness to heat treatment are approximately the same.

1050 (CF) — Strain hardened, stress relieved material which offers 100 KSI yield strength. Improved strength over 1045. Conforms to ASTM A311.

1141 (HR, CF) — A medium carbon, special quality, manganese steel with improved machinability and better heat treatment response (surface hardness is deeper and more uniform) than plain carbon steels. Good as-rolled strength and toughness. Uses include gears, shafts, axles, bolts, studs, pins, etc.

11L41 (HR, CF) — Has all the desirable characteristics of 1141 plus greatly superior machinability due to 0.15%/0.35% lead addition.

1144 (HR, CF) — Similar to 1141 with slightly higher carbon and sulphur content resulting in superior machinability and improved response to heat treating. Often used for induction hardened parts requiring 55 RC surface.

1144 A311 CL.B (CF) — Steel bars with 100 KSI minimum yield. Capable of flame hardening to 56-60 R.D. for such applications as piston rods. Conforms to ASTM A311.

Stressproof® (CF) — High strength without heat treatment. Stress relieved. Readily machinable with minimum distortion. Niagara LaSalle Stressproof meets ASTM A311, Class B.

Fatigue-Proof® (CF) — Higher strength than Stressproof® achieved by mechanical working and thermal treatment. Eliminates need for heat treating and secondary operations (cleaning, straightening, etc.). Readily machinable with low residual stresses.

SCREW STOCK

(For free machining, alloy steels see the Alloy section.)

These are the **fastest machining** steels for highest production rates on screw machines. All are in the low carbon range and can be case hardened. When superior case hardening qualities are required, selection can be made from the low carbon-case hardening steels.

1215 (HR, CF) — Fast cutting steel is the standard screw stock. A resulphurized and rephosphurized steel for typical production runs. Cutting speeds and machining characteristics approach Ledloy 300. Machined finish is smooth and bright. CF conforms to ASTM A108, HR to A576.

1214Bi — A lead-free alternative to 12L14 and 12L14Te or Se. Bismuth in steel act as internal lubricant, thus reducing cutting forces and minimizing tool wear at same high rates as leaded products. Conforms to ASTM A108.

12L14 (CF) — A lead bearing steel with average machining rates 30% to 40% faster than 1215. Here's a steel that offers inherent ductility combined with finer surface quality. Since 12L14 is an extraordinarily fast machining steel, it has become the favorite for automatic screw machine work. Conforms to ASTM A108.

12L14+Te and 12L14+Se (CF) — A leaded tellurium or selenium bearing material which is among our fastest machining steel bars. Increases parts production a minimum of 25% over conventional leaded steel. Finish is excellent and savings in tool life are substantial. Conforms to ASTM A108.

GROUND & POLISHED SHAFTING

Extreme size accuracy, straightness and concentricity to minimize wear in high speed applications. **Turned,** ground & polished bars can be machined unsymmetrically, as in key-seating, with minimum distortion because cold drawing strains are not developed. **Drawn,** ground & polished bars combine the strength advantages of cold drawn stock with extra accuracy and lustrous finish. Conforms to ASTM A108.

ACCURACY ROUNDS

Special finish drawn, ground & polished bars are used where extreme precision and size accuracy, straightness and finish are necessary. Conforms to ASTM A108.

CHROME PLATED BARS

Our stock includes chrome plated bars for cylinder applications in most any stock size or in the custom size you need. All bars are precision ground and plated to 68/70 Rc surface hardness with 6/12 RMS finish. Plating thickness .0005" min per side. To protect surfaces, we cardboard tube bars during all phases of handling and storage.

IRON BARS

Our stock includes Class 40 Gray Iron, 65-45-12 Ductile Iron, 80-55-06 Ductile Iron. Offers increased machinability and enhanced wear properties. Can be heat treated with any conventional process.