

# COLD FINISHED STEEL BARS

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ADDITIONAL GRADES & SIZES  
AVAILABLE UPON REQUEST

# STEEL BARS

HOT ROLLED or COLD FINISHED

*Which should you use?*

2  
Cold  
Finished  
Steel  
Bars

The choice depends upon the purpose. Hot rolled bars, without any further finishing, are chosen for many general uses, thus saving you money. However, it may pay you to use Cold Finished bars which cost more at the start, but which may save you money, time and trouble in the long run. Cold finishing, which usually consists of cold drawing and/or turning, grinding and polishing, results in higher yield points and has these four main advantages:

**The first is finish.** Cold drawing through a die imparts a bright new surface.

**The second advantage** is size tolerance, concentricity, straightness. C.F. bars are close dimensionally and in roundness. A 1" diameter C.F. bar of AISI 1018 is plus 0.000 in, minus 0.002 in. A hot rolled bar of the same diameter is plus or minus 0.009.

**The third advantage.** Cold drawing increases the yield and tensile strengths, this often eliminating further costly thermal treatments.

**The fourth and the most important for many jobs is machinability,** which is often improved by as much as 20%. This can mean savings through increased tool life, higher cutting speeds and a better surface finish.

We would be glad to advise as to the right bar to choose for any specific purpose. We carry in stock eleven types of Hot Rolled Bars and eight types of Cold Finished – a wide enough choice to meet virtually every need.

## **COLD FINISHED STEEL BARS**

Brief descriptions of the various types of cold finished bars carried in stock. There is a wide choice – making it easy for you to select the right type for the right purpose.

### **AISI C1018**

Basic cold finished steel of the low carbon range. Used for light motor shafts, furniture legs, bolts, etc.

### **AISI C1215**

Used where machinability is more important than strength. It is a free cutting steel. It has a good surface finish and good brazing properties.

### **AISI C1045**

A medium carbon steel for use where a fair response to thermal treatment is desirable. This grade may not be hot forged. It is used extensively in induction or flame hardened applications.

### **AISI C12L14**

Free machining quality of the low carbon range. Lead has been added to improve the machining speeds. Used in automatic lathes for high speed production of fasteners, bolts, nuts, electrical parts.

## **PRECISION GROUND SHAFTING**

In the 1040-1045 carbon range. Have been precision ground to give close tolerances. Used for shafts where bearings have to be fitted, pistons, press rollers, etc.

### **C1144 ASTM A311 CLASS B**

A strong cold finished bar that eliminates heat treating in most cases. Has a 100,000 *psi* yield strength and a good hardness factor.

Can be welded and induction hardened. Used for gears, high strength nuts, shafts, worm gears and pinions.

### **FATIGUEPROOF**

The same caliber of material as C1144 but offering yet higher strengths.

# STANDARD MANUFACTURING TOLERANCES

## COLD FINISHED STEEL

| ROUNDS                 | Carbon<br>.28% or less | Carbon<br>.29% to 55% incl. |
|------------------------|------------------------|-----------------------------|
| 1½" or under           | .002" minus            | .003" minus                 |
| Over 1½" to 2½", incl. | .003" minus            | .004" minus                 |
| Over 2½" to 4", incl.  | .004" minus            | .005" minus                 |
| Over 4" to 6", incl.   | .005" minus            | .006" minus                 |
| Over 6" to 8", incl.   | .006" minus            | .007" minus                 |

| HEXAGONS               | Carbon<br>.28% or less | Carbon<br>.29% to 55% incl. |
|------------------------|------------------------|-----------------------------|
| Up to ¾", incl.        | .002" minus            | .003" minus                 |
| Over ¾" to 1½", incl.  | .003" minus            | .004" minus                 |
| Over 1½" to 2½", incl. | .004" minus            | .005" minus                 |
| Over 2½" to 3½", incl. | .005" minus            | .006" minus                 |

| SQUARES                | Carbon<br>.28% or less | Carbon<br>.29% to 55% incl. |
|------------------------|------------------------|-----------------------------|
| Up to ¾", incl.        | .002" minus            | .004" minus                 |
| Over ¾" to 1½", incl.  | .003" minus            | .005" minus                 |
| Over 1½" to 2½", incl. | .004" minus            | .006" minus                 |
| Over 2½" to 4", incl.  | .006" minus            | .008" minus                 |

| FLATS<br>(width)      | Carbon<br>.28% or less | Carbon<br>.29% to 55% incl. |
|-----------------------|------------------------|-----------------------------|
| Up to ¾", incl.       | .003" minus            | .004" minus                 |
| Over ¾" to 1½", incl. | .004" minus            | .005" minus                 |
| Over 1½" to 3", incl. | .005" minus            | .006" minus                 |
| Over 3" to 4", incl.  | .006" minus            | .008" minus                 |
| Over 4" to 6", incl.  | .008" minus            | .010" minus                 |
| Over 6" to 12", incl. | .013" minus            | .015" minus                 |

Standard manufacturing tolerances provide for undersize variation only.

These tolerances do not apply on bars which are stress relieved after cold finishing or heat treated before cold finishing.

The tolerances on flats apply to thickness as well as width.

# COLD FINISHED STEEL BARS


## AISI C1018/C1020

Suitable for standard shafting purposes where the applications do not require the greater strength of higher carbon or alloy steels. It is also recommended for general purposes as it forms well, welds readily and has good machinability. Can be case hardened where necessary.

### Chemical Analysis

|       | Carbon   | Manganese | Phosphorus | Sulphur   |
|-------|----------|-----------|------------|-----------|
| C1018 | .15/.20% | .60/.90%  | .04% max.  | .05% max. |


**Stock Lengths** – Up to  $\frac{3}{8}$ " round incl. random 10 to 12 feet  
– Over  $\frac{3}{8}$ " random 20 to 22 feet

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| ROUNDS               |                                |  |                                |
| $\frac{3}{16}$ dia.  | .094                           | $2\frac{5}{8}$ dia.                                                               | 18.40                          |
| $\frac{1}{4}$        | .167                           | $2\frac{1}{4}$                                                                    | 19.28                          |
| $\frac{5}{16}$       | .261                           | $2\frac{3}{4}$                                                                    | 20.19                          |
| $\frac{3}{8}$        | .376                           | $2\frac{13}{16}$                                                                  | 21.12                          |
| $\frac{7}{16}$       | .511                           | $2\frac{7}{8}$                                                                    | 22.07                          |
| $\frac{1}{2}$        | .668                           | $2\frac{15}{16}$                                                                  | 23.04                          |
| $\frac{9}{16}$       | .845                           |                                                                                   |                                |
| $\frac{5}{8}$        | 1.04                           | 3                                                                                 | 24.03                          |
| $\frac{11}{16}$      | 1.26                           | $3\frac{1}{16}$                                                                   | 25.04                          |
| $\frac{3}{4}$        | 1.50                           | $3\frac{1}{8}$                                                                    | 26.07                          |
| $\frac{13}{16}$      | 1.76                           | $3\frac{3}{16}$                                                                   | 27.13                          |
| $\frac{7}{8}$        | 2.04                           | $3\frac{1}{4}$                                                                    | 28.20                          |
| $\frac{15}{16}$      | 2.35                           | $3\frac{5}{16}$                                                                   | 29.30                          |
| 1                    | 2.67                           | $3\frac{3}{8}$                                                                    | 30.41                          |
| $1\frac{1}{16}$      | 3.01                           | $3\frac{7}{16}$                                                                   | 31.55                          |
| $1\frac{1}{8}$       | 3.38                           | $3\frac{1}{2}$                                                                    | 32.71                          |
| $1\frac{3}{16}$      | 3.77                           | $3\frac{5}{8}$                                                                    | 35.09                          |
| $1\frac{1}{4}$       | 4.17                           | $3\frac{11}{16}$                                                                  | 36.31                          |
| $1\frac{5}{16}$      | 4.60                           | $3\frac{3}{4}$                                                                    | 37.55                          |
| $1\frac{3}{8}$       | 5.05                           | $3\frac{7}{8}$                                                                    | 40.09                          |
| $1\frac{7}{16}$      | 5.52                           | $3\frac{15}{16}$                                                                  | 41.40                          |
| $1\frac{1}{2}$       | 6.01                           | 4                                                                                 | 42.72                          |
| $1\frac{9}{16}$      | 6.52                           | $4\frac{3}{16}$                                                                   | 46.82                          |
| $1\frac{5}{8}$       | 7.05                           | $4\frac{1}{4}$                                                                    | 48.23                          |
| $1\frac{11}{16}$     | 7.60                           | $4\frac{7}{16}$                                                                   | 52.58                          |
| $1\frac{3}{4}$       | 8.18                           | $4\frac{1}{2}$                                                                    | 54.07                          |
| $1\frac{13}{16}$     | 8.77                           | $4\frac{3}{4}$                                                                    | 60.24                          |
| $1\frac{7}{8}$       | 9.39                           | $4\frac{15}{16}$                                                                  | 65.09                          |
| $1\frac{15}{16}$     | 10.02                          |                                                                                   |                                |
| 2                    | 10.68                          | 5                                                                                 | 66.75                          |
| $2\frac{1}{16}$      | 11.36                          | $5\frac{1}{4}$                                                                    | 73.59                          |
| $2\frac{1}{8}$       | 12.06                          | $5\frac{7}{16}$                                                                   | 78.95                          |
| $2\frac{3}{16}$      | 12.78                          | $5\frac{1}{2}$                                                                    | 80.78                          |
| $2\frac{1}{4}$       | 13.52                          | $5\frac{3}{4}$                                                                    | 88.28                          |
| $2\frac{5}{16}$      | 14.28                          | $5\frac{15}{16}$                                                                  | 94.13                          |
| $2\frac{3}{8}$       | 15.06                          | 6                                                                                 | 96.13                          |
| $2\frac{7}{16}$      | 15.86                          |                                                                                   |                                |
| $2\frac{1}{2}$       | 16.69                          | 7                                                                                 | 130.83                         |
| $2\frac{9}{16}$      | 17.53                          | 8                                                                                 | 170.88                         |

COLD FINISHED STEEL BARS

AISI C1018/C1020

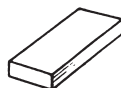
Stock Lengths – Random 10 to 12 feet

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| SQUARES              |                                |  |                                |
| 1/8 sq.              | .053                           |                                                                                   |                                |
| 3/16                 | .120                           | 1 1/4 sq.                                                                         | 5.31                           |
| 1/4                  | .213                           | 1 3/8                                                                             | 6.43                           |
| 5/16                 | .332                           | 1 1/2                                                                             | 7.65                           |
| 3/8                  | .478                           | 1 5/8                                                                             | 8.98                           |
| 7/16                 | .651                           | 1 3/4                                                                             | 10.41                          |
| 1/2                  | .850                           | 1 7/8                                                                             | 11.95                          |
| 9/16                 | 1.08                           | 2                                                                                 | 13.60                          |
| 5/8                  | 1.33                           | 2 1/4                                                                             | 17.21                          |
| 11/16                | 1.61                           | 2 1/2                                                                             | 21.25                          |
| 3/4                  | 1.91                           | 2 3/4                                                                             | 25.71                          |
| 7/8                  | 2.60                           | 3                                                                                 | 30.60                          |
| 15/16                | 2.99                           | 3 1/2                                                                             | 41.65                          |
| 1                    | 3.40                           | 4                                                                                 | 54.40                          |
| 1 1/8                | 4.30                           |                                                                                   |                                |

# COLD FINISHED STEEL FLATS

AISI C1018/C1020

Stock Lengths – Random 10 to 12 feet



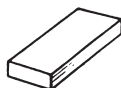
| Size<br>in<br>Inches              | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches              | Est. Weight<br>per Ft.<br>Lbs. |
|-----------------------------------|--------------------------------|-----------------------------------|--------------------------------|
| $\frac{1}{8} \times \frac{3}{8}$  | .159                           | $\frac{1}{4} \times \frac{1}{4}$  | 1.063                          |
| $\frac{1}{2}$                     | .213                           | $\frac{1}{2}$                     | 1.275                          |
| $\frac{5}{8}$                     | .266                           | $1\frac{3}{4}$                    | 1.488                          |
| $\frac{3}{4}$                     | .319                           | 2                                 | 1.700                          |
| $\frac{7}{8}$                     | .372                           | $2\frac{1}{4}$                    | 1.913                          |
| 1                                 | .425                           | $2\frac{1}{2}$                    | 2.125                          |
| $1\frac{1}{8}$                    | .478                           | $2\frac{3}{4}$                    | 2.338                          |
| $1\frac{1}{4}$                    | .531                           | 3                                 | 2.550                          |
| $1\frac{1}{2}$                    | .638                           | $3\frac{1}{2}$                    | 2.975                          |
| $1\frac{3}{4}$                    | .744                           | 4                                 | 3.400                          |
| 2                                 | .850                           | $4\frac{1}{2}$                    | 3.825                          |
| $2\frac{1}{4}$                    | .956                           | 5                                 | 4.250                          |
| $2\frac{1}{2}$                    | 1.063                          | 6                                 | 5.100                          |
| 3                                 | 1.275                          | 8                                 | 6.800                          |
| $3\frac{1}{2}$                    | 1.488                          | 10                                | 8.500                          |
| 4                                 | 1.700                          | 12                                | 10.200                         |
| 5                                 | 2.125                          |                                   |                                |
| 6                                 | 2.550                          |                                   |                                |
|                                   |                                | $\frac{5}{16} \times \frac{1}{2}$ | .531                           |
|                                   |                                | $\frac{3}{4}$                     | .797                           |
| $\frac{3}{16} \times \frac{1}{2}$ | .319                           | $\frac{7}{8}$                     | .930                           |
| $\frac{5}{8}$                     | .398                           | 1                                 | 1.063                          |
| $\frac{3}{4}$                     | .478                           | $1\frac{1}{4}$                    | 1.328                          |
| $\frac{7}{8}$                     | .558                           | $1\frac{1}{2}$                    | 1.594                          |
| 1                                 | .638                           | $1\frac{3}{4}$                    | 1.859                          |
| $1\frac{1}{4}$                    | .797                           | 2                                 | 2.125                          |
| $1\frac{1}{2}$                    | .956                           | $2\frac{1}{4}$                    | 2.390                          |
| $1\frac{3}{4}$                    | 1.116                          | $2\frac{1}{2}$                    | 2.656                          |
| 2                                 | 1.275                          | 3                                 | 3.188                          |
| $2\frac{1}{4}$                    | 1.434                          | $3\frac{1}{2}$                    | 3.719                          |
| $2\frac{1}{2}$                    | 1.594                          | 4                                 | 4.250                          |
| 3                                 | 1.913                          | 5                                 | 5.313                          |
| $3\frac{1}{2}$                    | 2.230                          | 6                                 | 6.375                          |
| 4                                 | 2.550                          | 8                                 | 8.500                          |
| 5                                 | 3.188                          |                                   |                                |
| 6                                 | 3.825                          |                                   |                                |
|                                   |                                | $\frac{3}{8} \times \frac{1}{2}$  | .638                           |
| $\frac{1}{4} \times \frac{3}{8}$  | .319                           | $\frac{5}{8}$                     | .797                           |
| $\frac{1}{2}$                     | .425                           | $\frac{3}{4}$                     | .956                           |
| $\frac{5}{8}$                     | .531                           | $\frac{7}{8}$                     | 1.116                          |
| $\frac{3}{4}$                     | .638                           | 1                                 | 1.275                          |
| $\frac{7}{8}$                     | .744                           | $1\frac{1}{4}$                    | 1.594                          |
| 1                                 | .850                           | $1\frac{3}{8}$                    | 1.753                          |
|                                   |                                | $1\frac{1}{2}$                    | 1.913                          |
|                                   |                                | $1\frac{3}{4}$                    | 2.231                          |
|                                   |                                | 2                                 | 2.550                          |
|                                   |                                | $2\frac{1}{4}$                    | 2.869                          |

Cont'd

# COLD FINISHED STEEL FLATS

AISI C1018/C1020

Stock Lengths – Random 10 to 12 feet



| Size<br>in<br>Inches           | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches           | Est. Weight<br>per Ft.<br>Lbs. |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| $\frac{3}{8}$ x $2\frac{1}{2}$ | 3.188                          | $\frac{5}{8}$ x $3\frac{1}{2}$ | 7.438                          |
| 3                              | 3.825                          | $3\frac{3}{4}$                 | 7.969                          |
| $3\frac{1}{2}$                 | 4.463                          | 4                              | 8.500                          |
| 4                              | 5.100                          | 5                              | 10.625                         |
| $4\frac{1}{2}$                 | 5.738                          | $5\frac{1}{2}$                 | 11.688                         |
| 5                              | 6.375                          | 6                              | 12.750                         |
| 6                              | 7.650                          | 8                              | 17.000                         |
| 8                              | 10.20                          | 10                             | 21.250                         |
| 10                             | 12.750                         | 12                             | 25.500                         |
| 12                             | 15.300                         |                                |                                |
| $\frac{1}{2}$ x $\frac{5}{8}$  | 1.063                          | $\frac{3}{4}$ x 1              | 2.550                          |
| $\frac{3}{4}$                  | 1.275                          | $1\frac{1}{4}$                 | 3.188                          |
| $\frac{7}{8}$                  | 1.488                          | $1\frac{1}{2}$                 | 3.825                          |
| 1                              | 1.700                          | $1\frac{3}{4}$                 | 4.463                          |
| $1\frac{1}{4}$                 | 2.125                          | 2                              | 5.100                          |
| $1\frac{1}{2}$                 | 2.550                          | $2\frac{1}{4}$                 | 5.738                          |
| $1\frac{3}{4}$                 | 2.975                          | $2\frac{1}{2}$                 | 6.375                          |
| 2                              | 3.400                          | $2\frac{3}{4}$                 | 7.013                          |
| $2\frac{1}{4}$                 | 3.825                          | 3                              | 7.650                          |
| $2\frac{1}{2}$                 | 4.250                          | $3\frac{1}{2}$                 | 8.925                          |
| 3                              | 5.100                          | 4                              | 10.200                         |
| $3\frac{1}{4}$                 | 5.525                          | $4\frac{1}{2}$                 | 11.475                         |
| $3\frac{1}{2}$                 | 5.950                          | 5                              | 12.750                         |
| 4                              | 6.800                          | 6                              | 15.300                         |
| $4\frac{1}{2}$                 | 7.650                          | $6\frac{1}{2}$                 | 16.575                         |
| 5                              | 8.500                          | 8                              | 20.400                         |
| 6                              | 10.200                         | 10                             | 25.500                         |
| 8                              | 13.600                         | 12                             | 30.600                         |
| 10                             | 17.000                         |                                |                                |
| 12                             | 20.400                         | $\frac{7}{8}$ x 1              | 2.975                          |
| $\frac{5}{8}$ x $\frac{3}{4}$  | 1.594                          | $1\frac{1}{2}$                 | 4.463                          |
| $\frac{7}{8}$                  | 1.859                          | 2                              | 5.950                          |
| 1                              | 2.125                          | 3                              | 8.925                          |
| $1\frac{1}{4}$                 | 2.656                          | 4                              | 11.900                         |
| $1\frac{1}{2}$                 | 3.188                          | 5                              | 14.875                         |
| $1\frac{3}{4}$                 | 3.719                          | 6                              | 17.850                         |
| 2                              | 4.250                          |                                |                                |
| $2\frac{1}{4}$                 | 4.781                          | 1 x $1\frac{1}{4}$             | 4.250                          |
| $2\frac{1}{2}$                 | 5.313                          | $1\frac{1}{8}$                 | 4.675                          |
| $2\frac{3}{4}$                 | 5.844                          | $1\frac{1}{2}$                 | 5.100                          |
| 3                              | 6.375                          | $1\frac{3}{4}$                 | 5.950                          |
|                                |                                | 2                              | 6.800                          |
|                                |                                | $2\frac{1}{4}$                 | 7.650                          |
|                                |                                | $2\frac{1}{2}$                 | 8.500                          |

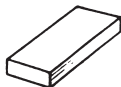
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# COLD FINISHED STEEL FLATS

AISI C1018/C1020

Stock Lengths – Random 10 to 12 feet



| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|----------------------|--------------------------------|
| 1 x 3                | 10.200                         | 1½ x 10              | 51.000                         |
| 3½                   | 11.900                         | 12                   | 61.200                         |
| 4                    | 13.600                         |                      |                                |
| 4½                   | 15.300                         |                      |                                |
| 5                    | 17.000                         | 1¾ x 2               | 11.900                         |
| 6                    | 20.400                         | 2½                   | 14.875                         |
| 8                    | 27.200                         | 3                    | 17.850                         |
| 10                   | 34.000                         | 3½                   | 20.825                         |
| 12                   | 40.800                         | 4                    | 23.800                         |
|                      |                                | 5½                   | 32.725                         |
|                      |                                | 6                    | 35.700                         |
| 1¼ x 1½              | 6.375                          |                      |                                |
| 1¾                   | 7.438                          |                      |                                |
| 2                    | 8.500                          | 2 x 2½               | 17.000                         |
| 2¼                   | 9.563                          | 2¾                   | 18.700                         |
| 2½                   | 10.625                         | 3                    | 20.400                         |
| 3                    | 12.750                         | 3½                   | 23.800                         |
| 3½                   | 14.875                         | 4                    | 27.200                         |
| 4                    | 17.000                         | 5                    | 34.000                         |
| 4½                   | 19.125                         | 6                    | 40.800                         |
| 5                    | 21.250                         | 8                    | 54.400                         |
| 5½                   | 23.375                         | 10                   | 68.000                         |
| 6                    | 25.500                         | 12                   | 81.600                         |
| 8                    | 34.000                         |                      |                                |
| 10                   | 42.500                         |                      |                                |
|                      |                                | 2½ x 3               | 25.500                         |
| 1½ x 1¾              | 8.925                          | 4                    | 34.000                         |
| 2                    | 10.200                         | 5                    | 42.500                         |
| 2½                   | 12.750                         | 6                    | 51.000                         |
| 3                    | 15.300                         |                      |                                |
| 3½                   | 17.850                         |                      |                                |
| 4                    | 20.400                         | 3 x 3½               | 35.700                         |
| 5                    | 25.500                         | 4                    | 40.800                         |
| 6                    | 30.600                         | 6                    | 61.200                         |
| 8                    | 40.800                         |                      |                                |


COLD FINISHED STEEL BARS

AISI C1045

Chemical Analysis

|       |                    |                       |                         |                      |
|-------|--------------------|-----------------------|-------------------------|----------------------|
| C1045 | Carbon<br>.43/.50% | Manganese<br>.60/.90% | Phosphorus<br>.04% max. | Sulphur<br>.05% max. |
|-------|--------------------|-----------------------|-------------------------|----------------------|

Stock Lengths – Random 20 to 22 feet

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| ROUNDS               |                                |  |                                |
| 1/2 dia.             | .668                           | 2 dia.                                                                            | 10.68                          |
| 5/8                  | 1.04                           | 2 1/4                                                                             | 13.52                          |
| 3/4                  | 1.50                           | 2 1/2                                                                             | 16.69                          |
| 7/8                  | 2.04                           | 2 3/4                                                                             | 20.19                          |
|                      |                                | 2 7/8                                                                             | 22.07                          |
| 1                    | 2.67                           |                                                                                   |                                |
| 1 1/8                | 3.38                           | 3                                                                                 | 24.03                          |
| 1 1/4                | 4.17                           | 3 1/2                                                                             | 32.71                          |
| 1 3/8                | 5.05                           |                                                                                   |                                |
| 1 1/2                | 6.01                           | 4                                                                                 | 42.72                          |
| 1 5/8                | 7.05                           |                                                                                   |                                |
| 1 3/4                | 8.18                           |                                                                                   |                                |
| 1 15/16              | 10.02                          |                                                                                   |                                |


COLD FINISHED STEEL BARS

AISI C1215

Chemical Analysis

|       |                     |                        |                          |                       |
|-------|---------------------|------------------------|--------------------------|-----------------------|
| C1215 | Carbon<br>.09% max. | Manganese<br>.75/1.05% | Phosphorus<br>.04 / .09% | Sulphur<br>.26 / .35% |
|-------|---------------------|------------------------|--------------------------|-----------------------|

Stock Lengths – Random 10 to 12 feet

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| ROUNDS               |                                |  |                                |
| 1/4 dia.             | .167                           | 1 1/2                                                                             | 6.01                           |
| 5/16                 | .261                           | 1 9/16 dia.                                                                       | 6.52                           |
| 3/8                  | .376                           | 1 5/8                                                                             | 7.05                           |
| 7/16                 | .511                           | 1 11/16                                                                           | 7.60                           |
| 1/2                  | .668                           | 1 3/4                                                                             | 8.18                           |
| 9/16                 | .845                           | 1 13/16                                                                           | 8.77                           |
| 5/8                  | 1.04                           | 1 7/8                                                                             | 9.39                           |
| 11/16                | 1.26                           | 1 15/16                                                                           | 10.02                          |
| 3/4                  | 1.50                           |                                                                                   |                                |
| 13/16                | 1.76                           | 2                                                                                 | 10.68                          |
| 7/8                  | 2.04                           | 2 1/16                                                                            | 11.36                          |
| 15/16                | 2.35                           | 2 1/8                                                                             | 12.06                          |
|                      |                                | 2 3/16                                                                            | 12.78                          |
| 1                    | 2.67                           | 2 1/4                                                                             | 13.52                          |
| 1 1/16               | 3.01                           | 2 5/16                                                                            | 14.28                          |
| 1 1/8                | 3.38                           | 2 3/8                                                                             | 15.06                          |
| 1 3/16               | 3.77                           | 2 7/16                                                                            | 15.86                          |
| 1 1/4                | 4.17                           | 2 1/2                                                                             | 16.69                          |
| 1 5/16               | 4.60                           |                                                                                   |                                |
| 1 3/8                | 5.05                           |                                                                                   |                                |
| 1 7/8                | 5.52                           |                                                                                   |                                |

# COLD FINISHED STEEL BARS

## LEADED AISI C 12L14


This is ultra fast cutting steel and is about 45% faster than B-1113 and 100% faster than B-1112. Normal cutting speed is 270-290 surface feet per minute. Speeds up to 450 are possible with high speed tools.

Mechanical properties are approximately the same as B-1113. Being an Open Hearth Steel it is freer from seams, slivers and laps than the B-1112 or B-1113 Bessemer steels. It can be machined to a smoother finish than is possible with other free cutting steels and this better finish permits a better base where any plating is to be done. The lead has no detrimental action in most plating operations. Carburizing qualities are superior to those of the free cutting Bessemer steels.

### Chemical Analysis

|         | Carbon    | Manganese | Phosphorus | Sulphur  | Lead     |
|---------|-----------|-----------|------------|----------|----------|
| C-12L14 | .15% max. | .80/1.20% | .04/.09%   | .25/.35% | .15/.35% |

### Stock lengths – Random 10 to 12 feet



| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| ROUNDS               |                                |  |                                |
| 3/32 dia.            | .023                           | 1 1/2 dia.                                                                        | 6.01                           |
| 1/8                  | .042                           | 1 9/16                                                                            | 6.52                           |
| 5/32                 | .065                           | 1 5/8                                                                             | 7.05                           |
| 3/16                 | .094                           | 1 11/16                                                                           | 7.60                           |
| 7/32                 | .128                           | 1 3/4                                                                             | 8.18                           |
| 1/4                  | .167                           | 1 13/16                                                                           | 8.77                           |
| 9/32                 | .211                           | 1 7/8                                                                             | 9.39                           |
| 5/16                 | .261                           | 1 15/16                                                                           | 10.02                          |
| 11/32                | .316                           | 2                                                                                 | 10.68                          |
| 3/8                  | .376                           | 2 1/16                                                                            | 11.36                          |
| 13/32                | .441                           | 2 1/8                                                                             | 12.06                          |
| 7/16                 | .511                           | 2 3/16                                                                            | 12.78                          |
| 15/32                | .587                           | 2 1/4                                                                             | 13.52                          |
| 1/2                  | .668                           | 2 3/8                                                                             | 15.06                          |
| 9/16                 | .845                           | 2 7/16                                                                            | 15.86                          |
| 5/8                  | 1.04                           | 2 1/2                                                                             | 16.69                          |
| 11/16                | 1.26                           | 2 5/8                                                                             | 18.40                          |
| 3/4                  | 1.50                           | 2 3/4                                                                             | 20.19                          |
| 13/16                | 1.76                           | 2 7/8                                                                             | 22.07                          |
| 7/8                  | 2.04                           | 3                                                                                 | 24.03                          |
| 15/16                | 2.35                           | 3 1/4                                                                             | 28.20                          |
| 1                    | 2.67                           | 3 1/2                                                                             | 32.71                          |
| 1 1/16               | 3.01                           | 3 3/4                                                                             | 37.55                          |
| 1 1/8                | 3.38                           | 4                                                                                 | 42.72                          |
| 1 3/16               | 3.77                           | 4 1/4                                                                             | 48.23                          |
| 1 1/4                | 4.17                           | 4 1/2                                                                             | 54.07                          |
| 1 5/16               | 4.60                           | 5                                                                                 | 66.75                          |
| 1 3/8                | 5.05                           |                                                                                   |                                |
| 1 7/16               | 5.52                           |                                                                                   |                                |

Cont'd

# COLD FINISHED STEEL BARS

LEADED AISI C 12L14

Stock Lengths – Random 10 to 12 feet

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| SQUARES              |                                |  |                                |
| 1/2 sq.              | .850                           | 1 sq.                                                                             | 3.40                           |
| 9/16                 | 1.08                           | 1 1/8                                                                             | 4.30                           |
| 5/8                  | 1.33                           | 1 1/4                                                                             | 5.31                           |
| 3/4                  | 1.91                           | 1 1/2                                                                             | 7.65                           |
| 7/8                  | 2.60                           | 1 3/4                                                                             | 10.41                          |
|                      |                                | 2                                                                                 | 13.60                          |
| HEXAGONS             |                                |  |                                |
| 3/16 across flats    | .104                           | 1 3/8 across flats                                                                | 5.58                           |
| 1/4                  | .184                           | 1 7/16                                                                            | 6.10                           |
| 5/16                 | .288                           | 1 1/2                                                                             | 6.64                           |
| 3/8                  | .415                           | 1 5/8                                                                             | 7.79                           |
| 7/16                 | .565                           | 1 11/16                                                                           | 8.40                           |
| 1/2                  | .738                           | 1 3/4                                                                             | 9.03                           |
| 9/16                 | .933                           | 1 13/16                                                                           | 9.69                           |
| 5/8                  | 1.15                           | 1 7/8                                                                             | 10.37                          |
| 11/16                | 1.39                           |                                                                                   |                                |
| 3/4                  | 1.66                           | 2                                                                                 | 11.80                          |
| 13/16                | 1.95                           | 2 1/8                                                                             | 13.32                          |
| 7/8                  | 2.26                           | 2 1/4                                                                             | 14.93                          |
| 15/16                | 2.59                           | 2 3/8                                                                             | 16.64                          |
|                      |                                | 2 1/2                                                                             | 18.44                          |
| 1                    | 2.95                           | 2 3/4                                                                             | 22.31                          |
| 1 1/16               | 3.33                           |                                                                                   |                                |
| 1 1/8                | 3.73                           | 3                                                                                 | 26.55                          |
| 1 3/16               | 4.16                           | 3 1/2                                                                             | 36.14                          |
| 1 1/4                | 4.61                           |                                                                                   |                                |
| 1 5/16               | 5.08                           | 4                                                                                 | 47.20                          |

# PRECISION GROUND SHAFTING

## Standard Tolerances:


|                   |    |                  |                                        |
|-------------------|----|------------------|----------------------------------------|
| $\frac{1}{2}$ "   | to | $1\frac{1}{2}$ " | dia. incl. – plus .000" – minus .001"  |
| $>1\frac{1}{2}$ " | to | $2\frac{1}{2}$ " | dia. incl. – plus .000" – minus .0015" |
| $>2\frac{1}{2}$ " | to | 3"               | dia. incl. – plus .000" – minus .002"  |
| $>3$ "            | to | 4"               | dia. incl. – plus .000" – minus .003"  |
| $>4$ "            | to | 6"               | dia. incl. – plus .000" – minus .005"  |

## Chemical Analysis

|           |   |          |            |   |            |
|-----------|---|----------|------------|---|------------|
| Carbon    | – | .43/.48% | Phosphorus | – | .035% max. |
| Manganese | – | .60/.90% | Sulphur    | – | .045% max. |

Stock lengths – Random 20 to 24 feet

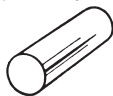
Some sizes available in 24 feet exact

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches                                                              | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|-----------------------------------------------------------------------------------|--------------------------------|
| ROUNDS               |                                |  |                                |
| $\frac{1}{2}$ dia.   | .668                           | $2\frac{1}{2}$ dia.                                                               | 16.69                          |
| $\frac{5}{8}$        | 1.04                           | $2\frac{9}{16}$                                                                   | 17.53                          |
| $\frac{3}{4}$        | 1.50                           | $2\frac{11}{16}$                                                                  | 19.28                          |
| $\frac{7}{8}$        | 2.04                           | $2\frac{3}{4}$                                                                    | 20.19                          |
| $1\frac{5}{16}$      | 2.35                           | $2\frac{15}{16}$                                                                  | 23.04                          |
| 1                    | 2.67                           | 3                                                                                 | 24.03                          |
| $1\frac{1}{16}$      | 3.01                           | $3\frac{3}{16}$                                                                   | 27.13                          |
| $1\frac{1}{8}$       | 3.38                           | $3\frac{1}{4}$                                                                    | 28.20                          |
| $1\frac{3}{16}$      | 3.77                           | $3\frac{3}{8}$                                                                    | 30.41                          |
| $1\frac{1}{4}$       | 4.17                           | $3\frac{7}{16}$                                                                   | 31.55                          |
| $1\frac{5}{16}$      | 4.60                           | $3\frac{1}{2}$                                                                    | 32.71                          |
| $1\frac{3}{8}$       | 5.05                           | $3\frac{3}{4}$                                                                    | 37.55                          |
| $1\frac{7}{16}$      | 5.52                           | $3\frac{15}{16}$                                                                  | 41.40                          |
| $1\frac{1}{2}$       | 6.01                           |                                                                                   |                                |
| $1\frac{5}{8}$       | 7.05                           | 4                                                                                 | 42.72                          |
| $1\frac{11}{16}$     | 7.60                           | $4\frac{1}{4}$                                                                    | 48.23                          |
| $1\frac{3}{4}$       | 8.18                           | $4\frac{7}{16}$                                                                   | 52.58                          |
| $1\frac{13}{16}$     | 8.77                           | $4\frac{1}{2}$                                                                    | 54.07                          |
| $1\frac{7}{8}$       | 9.39                           | $4\frac{15}{16}$                                                                  | 65.09                          |
| $1\frac{15}{16}$     | 10.02                          |                                                                                   |                                |
| 2                    | 10.68                          | 5                                                                                 | 66.75                          |
| $2\frac{1}{16}$      | 11.36                          | $5\frac{7}{16}$                                                                   | 78.95                          |
| $2\frac{1}{8}$       | 12.06                          | $5\frac{1}{2}$                                                                    | 80.78                          |
| $2\frac{3}{16}$      | 12.78                          | $5\frac{3}{4}$                                                                    | 88.28                          |
| $2\frac{1}{4}$       | 13.52                          | $5\frac{15}{16}$                                                                  | 94.13                          |
| $2\frac{5}{16}$      | 14.28                          |                                                                                   |                                |
| $2\frac{7}{16}$      | 15.86                          | 6                                                                                 | 96.12                          |

# C1144 ASTM A311 CLASS B ROUND STEEL BARS

**Yield Strength 100,000 Lbs./Sq. In. minimum**

A high carbon, manganese steel bar possessing excellent wear resisting properties without heat treating. Good machinability with a minimum of warpage after machining.



## Standard Tolerances:

- $\frac{1}{4}$ " to  $1\frac{1}{2}$ " diameter incl. – plus .000" – minus .004"
- $>1\frac{1}{2}$ " to  $2\frac{1}{2}$ " diameter incl. – plus .000" – minus .005"
- $>2\frac{1}{2}$ " to 4" diameter incl. – plus .000" – minus .006"
- $>4$ " to  $4\frac{1}{2}$ " diameter incl. – plus .000" – minus .007"

## Chemical Analysis

|            |   |           |         |   |         |
|------------|---|-----------|---------|---|---------|
| Carbon     | – | .40/.48   | Sulphur | – | .24/.33 |
| Manganese  | – | 1.35/1.65 | Silicon | – | .15/.30 |
| Phosphorus | – | .040 max. | Copper  | – | .15/.25 |

**Stock lengths – Random 20 to 22 feet**

| Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Est. Weight<br>per Ft.<br>Lbs. |
|----------------------|--------------------------------|----------------------|--------------------------------|
|----------------------|--------------------------------|----------------------|--------------------------------|

## SEVERELY COLD-WORKED, FURNACE-TREATED

|                    |      |                     |       |
|--------------------|------|---------------------|-------|
| $\frac{1}{4}$ dia. | .167 | $1\frac{3}{4}$ dia. | 8.18  |
| $\frac{5}{16}$     | .261 | $1\frac{7}{8}$      | 9.39  |
| $\frac{3}{8}$      | .376 | $1\frac{15}{16}$    | 10.02 |
| $\frac{7}{16}$     | .511 |                     |       |
| $\frac{1}{2}$      | .668 | 2                   | 10.68 |
| $\frac{5}{8}$      | 1.04 | $2\frac{1}{8}$      | 12.06 |
| $\frac{3}{4}$      | 1.50 | $2\frac{1}{4}$      | 13.52 |
| $\frac{13}{16}$    | 1.76 | $2\frac{3}{8}$      | 15.06 |
| $\frac{7}{8}$      | 2.04 | $2\frac{7}{16}$     | 15.86 |
| $\frac{15}{16}$    | 2.35 | $2\frac{1}{2}$      | 16.69 |
| 1                  | 2.67 | $2\frac{5}{8}$      | 18.40 |
| $1\frac{1}{8}$     | 3.38 | $2\frac{3}{4}$      | 20.19 |
| $1\frac{3}{16}$    | 3.77 | 3                   | 24.03 |
| $1\frac{1}{4}$     | 4.17 | $3\frac{1}{4}$      | 28.20 |
| $1\frac{5}{16}$    | 4.60 | $3\frac{1}{2}$      | 32.71 |
| $1\frac{3}{8}$     | 5.05 | $3\frac{3}{4}$      | 37.55 |
| $1\frac{7}{16}$    | 5.52 |                     |       |
| $1\frac{1}{2}$     | 6.01 | 4                   | 42.72 |
| $1\frac{5}{8}$     | 7.05 | $4\frac{1}{2}$      | 54.07 |

# **APPROXIMATE TENSILE STRENGTH AND BRINELL HARDNESS COLD FINISHED STEEL**

| Specifications   |          | Tensile Strength<br>Lbs. per sq. inch. | Brinell |
|------------------|----------|----------------------------------------|---------|
| SHAFTING QUALITY |          |                                        |         |
| S.A.E.           | A.I.S.I. |                                        |         |
| 1010             | C-1010   | 55/65,000                              | 124/162 |
| 1015             | C-1015   | 62/77,000                              | 124/171 |
| 1016             | C-1016   | 65/80,000                              | 133/171 |
| 1017             | C-1017   | 62/78,000                              | 133/171 |
| 1018             | C-1018   | 70/85,000                              | 140/188 |
| 1019             | C-1019   | 65/80,000                              | 133/171 |
| 1020             | C-1020   | 66/81,000                              | 133/181 |
| 1022             | C-1022   | 67/82,000                              | 143/190 |
| 1025             | C-1025   | 70/85,000                              | 143/190 |
| 1030             | C-1030   | 75/90,000                              | 152/200 |
| 1035             | C-1035   | 80/100,000                             | 171/209 |
| 1040             | C-1040   | 85/105,000                             | 181/209 |
| 1050             | C-1050   | 100/120,000                            | 200/247 |
| SCREW STOCK      |          |                                        |         |
| S.A.E.           | A.I.S.I. |                                        |         |
| 1118             | C-1118   | 70/90,000                              | 143/179 |
| 1137             | C-1137   | 90/120,000                             | 187/241 |
| —                | C-1212   | 80/95,000                              | 156/212 |
| —                | C-1213   | 80/95,000                              | 156/212 |
| —                | C-12L14  | 70/85,000                              | 150/180 |



# **GRADE CHARACTERISTICS**

|                                                | LOW CARBON |           |      |
|------------------------------------------------|------------|-----------|------|
|                                                | 1018       | 1117      | 1215 |
| MACHINABILITY<br>(Compared to<br>1212 as 100%) | 78%        | 91%       | 136% |
| WELDABILITY                                    | Excellent  | Fair      | Poor |
| BENDING                                        | Good       | Fair      | Poor |
| CARBURIZING                                    | Good       | Very good | Poor |
| THRU HARDENING                                 | Poor       | Poor      | Poor |
| WEAR                                           | Poor       | Poor      | Poor |
| HARDNESS                                       | Poor       | Fair      | Poor |

|                                                | MEDIUM CARBON |           |           | LEADED             |                    |
|------------------------------------------------|---------------|-----------|-----------|--------------------|--------------------|
|                                                | 1045          | 1141      | 1144      | 11L17              | 12L14              |
| MACHINABILITY<br>(Compared to<br>1212 as 100%) | 57%           | 70%       | 76%       | 104%               | 170%               |
| WELDABILITY                                    | Poor          | Poor      | Poor      | Not<br>Recommended | Not<br>Recommended |
| BENDING                                        | Good          | Poor      | Poor      | Fair               | Poor               |
| CARBURIZING                                    | Poor          | Poor      | Poor      | Very Good          | Poor               |
| THRU HARDENING                                 | Good          | Very Good | Very Good | Poor               | Poor               |
| WEAR                                           | Fair          | Good      | Good      | Poor               | Poor               |
| HARDNESS                                       | Good          | Good      | Good      | Fair               | Poor               |