

# NICKEL

## HASTELLOY ALLOYS

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## PRIMARY NICKEL HUNTINGTON\* ALLOYS

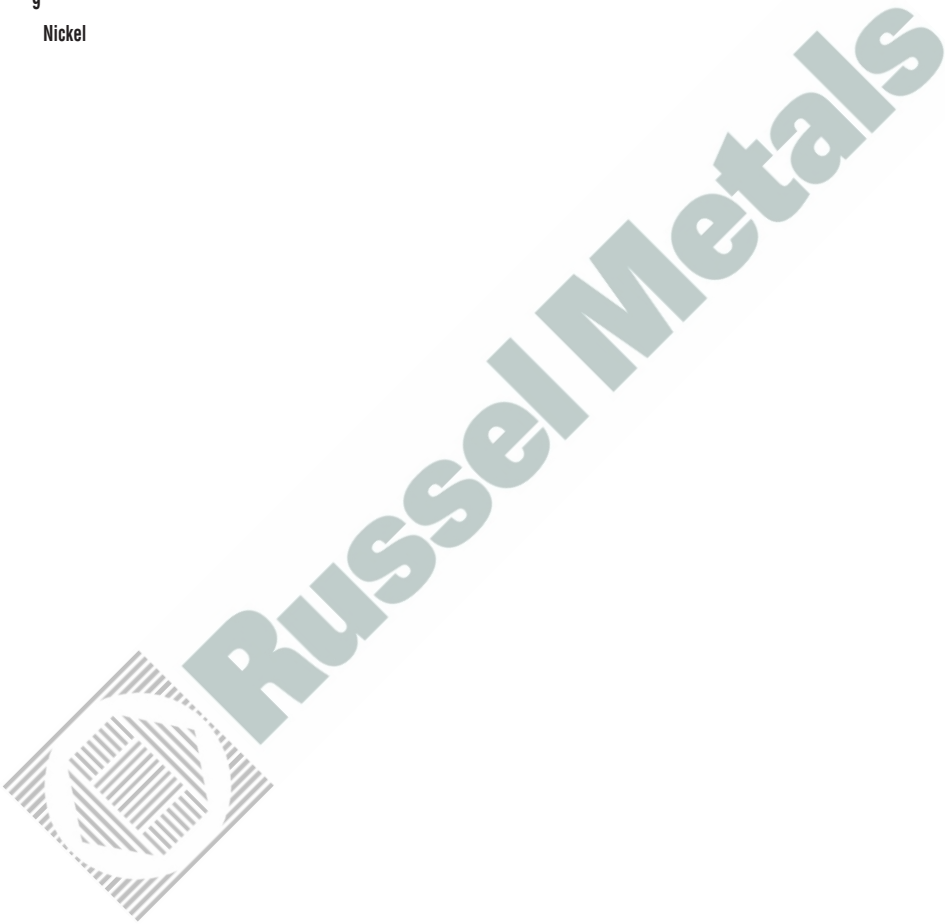
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\* Trade Marks of International  
Nickel Co. of Canada Ltd.

† Registered by Haynes Intl.

Nickel

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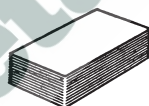
## NICKEL 200

Nickel is stronger, more ductile than structural bridge steel; it is immune to rust, highly resistant to most corrosives and to wear; it is noted for its excellent heat conductivity and heat transfer and is today used on hundreds of processing applications to protect the purity, colour, odor and flavor of the products handled. In addition, Nickel – due to its low gas content and high strength – is extensively used for electrical equipment, for the support wires, and other parts of incandescent lamps... for arc-resisting contact parts... for plates and grids in radio tubes... for metal parts of X-ray tubes. Nickel is readily fabricated by the usual methods: forging, cold forming, machining, welding and silver brazing, annealing, drawing and spinning.

### NICKEL ALLOY 200 COLD ROLLED SHEET

COLD ROLLED FINISH – ANNEALED TEMPER

SPEC ASTM B-162 / SB 162



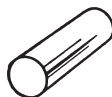
| Thickness<br>Inches | Size in<br>Inches | Theo. Weight<br>per Sq. Ft.-Lbs. | Theo. Weight<br>per Sheet-Lbs. |
|---------------------|-------------------|----------------------------------|--------------------------------|
| .062                | 48 x 120          | 2.865                            | 115                            |
| .078                | 48 x 120          | 3.605                            | 144                            |
| .109                | 48 x 120          | 5.038                            | 206                            |
| .125                | 48 x 120          | 5.776                            | 231                            |
| .140                | 48 x 120          | 6.471                            | 259                            |

### NICKEL ALLOY 200 COLD DRAWN BAR

COLD DRAWN FINISH – COLD DRAWN TEMPER

Stock Lengths – 6 to 20 Feet

SPEC ASTM B-160 / SB 160



| Size in<br>Inches | Theo. Weight<br>per Ft.-Lbs. | Size in<br>Inches | Theo. Weight<br>per Ft.-Lbs. |
|-------------------|------------------------------|-------------------|------------------------------|
| 1/4               | .189                         | 1                 | 3.028                        |
| 3/8               | .426                         | 1 1/2             | 6.801                        |
| 1/2               | .757                         | 2                 | 12.072                       |
| 3/4               | 1.700                        | 3                 | 27.243                       |

# NICKEL ALLOY 200

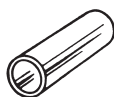
## COLD DRAWN SEAMLESS PIPE

SCHEDULE 40

COLD DRAWN FINISH – STRESS-RELIEVED TEMPER

Stock Lengths – 18 to 20 Feet

SPEC ASTM B-161 / SB 161



| Size in Inches | O.D.  | Wall Thickness | Theo. Weight per Ft.-Lbs. |
|----------------|-------|----------------|---------------------------|
| .500           | .840  | .109           | .964                      |
| .750           | 1.050 | .113           | 1.281                     |
| 1.000          | 1.315 | .133           | 1.902                     |
| 1.500          | 1.900 | .145           | 3.079                     |
| 2.000          | 2.375 | .154           | 4.139                     |
| 3.000          | 3.500 | .216           | 8.584                     |
| 4.000          | 4.500 | .237           | 12.226                    |
| 6.000          | 6.625 | .280           | 21.499                    |

## MONEL ALLOY 400

Monel is a non-ferrous alloy which contains approximately two-thirds nickel and one-third copper. It has a combination of high strength, hardness, ductility, and an excellent resistance to corrosion. It is a "general purpose" rather than a "specialized" alloy.

Monel offers: strength and toughness of structural steel... total immunity to rust... inherent resistance to corrosion... good performance under conditions of abrasion and erosion... and easy fabrication. This unique combination of properties assures long, economical life to Monel equipment even under "problem" conditions... trims production costs... accounts for the wide use of Monel in chemical, mechanical, electrical and other services. Case histories prove ultimate low cost.

Since Monel has come to play an important part in practically every industry, its combination of properties deserves careful study.

### *Corrosion Resistance:*

Monel is outstanding among metals for its ability to resist corrosion. It is particularly adapted for use with the corrosives most frequently encountered: common salt, dilute sulfuric acid, strong caustic soda. Other corrosives against which Monel is successful are: cold dilute hydrochloric acid, hydrofluoric acid, phosphoric acid, various organic acids, alum, zinc chloride, tri-sodium phosphate, potassium hydroxide, cresol, tannin and numerous solvents including carbon tetrachloride. Monel is not resistant to nitric acid, sulfurous acid and ferric chloride.

### *Mechanical Properties:*

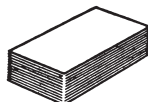
The strength of Monel is considerably above that of the common type of brasses, bronzes and nickel silvers, and comparable to that of structural steels. Though Monel Alloy 400 does not respond to heat treatment, a wide range in strength is obtained by mechanical working.

The properties of Monel are affected but little by temperature up to 800°F. It can be used continuously in sulfur-free oxidizing atmospheres as high as 1000°F. At sub-zero temperatures Monel suffers no loss in ductility or impact value and actually increases in strength.

# **MONEL ALLOY 400 COLD ROLLED SHEET**

**COLD ROLLED FINISH – ANNEALED TEMPER**

**SPEC ASTM B-127 / SB 127**



| U.S.S.<br>Gauge  | Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theoretical<br>Weight<br>per Sheet Lbs. |
|------------------|---------------------|----------------|-------------------------------------|---|
| 26               | .018                | 36 x 96        | .827                                | 21                                      |
| 24               | .025                | 36 x 96        | 1.148                               | 28                                      |
| 20               | .037                | 36 x 96        | 1.700                               | 41                                      |
| 18               | .050                | 36 x 96        | 2.297                               | 55                                      |
| 16               | .062                | 36 x 96        | 2.848                               | 68                                      |
|                  |                     | 48 x 96        |                                     | 91                                      |
|                  |                     | 48 x 120       |                                     | 114                                     |
| 14               | .078                | 48 x 120       | 3.583                               | 143                                     |
| 11               | .125                | 36 x 96        | 5.742                               | 138                                     |
|                  |                     | 48 x 120       |                                     | 230                                     |
| 10               | .140                | 48 x 120       | 6.431                               | 257                                     |
| $\frac{3}{16}$ " | .187                | 48 x 120       | 8.590                               | 340                                     |
| $\frac{1}{4}$ "  | .250                | 48 x 120       | 11.484                              | 459                                     |

## **MONEL ALLOY 400 HOT ROLLED PLATE**

**DESCALED FINISH – ANNEALED TEMPER**

**SPEC ASTM B-127 / SB 127 QQN 281-CLA**

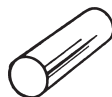
| Thickness<br>Inches | Size<br>Inches | Billing Weight<br>per Sq. Ft.<br>Lbs. | Billing Weight<br>Per Plate<br>Lbs. |
|---------------------|----------------|---------------------------------------|-------------------------------------|
| .187                | 72 x 180       | 8.928                                 | 804                                 |
| .250                | 72 x 180       | 11.952                                | 1076                                |
| .3125               | 72 x 180       | 14.832                                | 1335                                |
| .375                | 72 x 240       | 17.712                                | 2125                                |
| .500                | 48 x 120       | 23.616                                | 945                                 |
|                     | 72 x 180       |                                       | 2125                                |
| .625                | 60 x 180       | 29.520                                | 2214                                |
| .750                | 48 x 120       | 35.424                                | 1417                                |
|                     | 72 x 180       |                                       | 3188                                |
| .875                | 60 x 180       | 41.184                                | 3089                                |
| 1.000               | 48 x 120       | 47.088                                | 1884                                |

## **MONEL ALLOY 400 HOT FINISHED ROD**

**HOT FINISHED FINISH – HOT FINISHED TEMPER**

*Stock Lengths – Random 6 to 24 Feet*

**SPEC ASTM B-164 / SB 164 QQN 281-CLA**



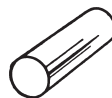
| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| ¼ dia.               | .188                            | 2                    | 12.0                            |
| ⅜                    | .423                            | 2¼                   | 15.2                            |
| ½                    | .752                            | 2⅜                   | 17.0                            |
| ⅝                    | 1.17                            | 2½                   | 18.8                            |
| ¾                    | 1.69                            | 2¾                   | 22.7                            |
| 7/8                  | 2.30                            | 3                    | 27.1                            |
| 1                    | 3.01                            | 3¼                   | 31.8                            |
| 1⅛                   | 3.81                            | 3½                   | 36.8                            |
| 1¼                   | 4.70                            | 4                    | 48.1                            |
| 1⅜                   | 5.68                            | 4½                   | 60.9                            |
| 1½                   | 6.76                            |                      |                                 |
| 1⅞                   | 7.94                            |                      |                                 |
| 1¾                   | 9.21                            |                      |                                 |

## **MONEL ALLOY 400 HOT FINISHED ROD**

**HOT FINISHED TEMPER – ROUGH TURNED**

*Stock Lengths – 6 to 24 Feet*

**SPEC ASTM B-164 / SB 164 QQN 281-CLA**



| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| 5                    | 75.2                            | 6                    | 107.6                           |
| 5½                   | 90.6                            | 8                    | 191.4                           |

## **MONEL ALLOY 400 HOT FINISHED – SQUARES**

**HOT FINISHED TEMPER – HOT FINISHED FINISH**

*Stock Lengths – Random 6 to 24 Feet*

**SPEC ASTM B-164 / SB 164 QQN 281-CLA**

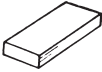
| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|
| 1" Square            | 3.83                            |
| 2" Square            | 15.3                            |

**MONEL ALLOY 400**  
**HOT FINISHED – FLATS**

HOT FINISHED FINISH – HOT FINISHED TEMPER

Stock Lengths – 6 to 24 Feet

SPEC ASTM B-164 / SB 164 QQN 281-CLA



| Size<br>in<br>Inches              | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches              | Theo. Weight<br>per Ft.<br>Lbs. |
|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|
| $\frac{1}{4} \times 1$            | .957                            | $\frac{3}{4} \times 2\frac{1}{2}$ | 7.16                            |
| $\times 1\frac{1}{2}$             | 1.440                           | 1 $\times$ 3                      | 11.45                           |
| $\frac{1}{2} \times 2\frac{1}{2}$ | 4.77                            |                                   |                                 |

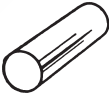
Intermediate sizes of flat bars are available sheared or abrasive cut from plate (not necessarily straight or flat).

**MONEL ALLOY 400**  
**COLD DRAWN ROD**

PRECISION STRAIGHTENED – STRESS RELIEVED

Stock Lengths – 6 to 20 Feet

SPEC ASTM B-164 / SB 164 QQN 281-CLA



| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| .188                 | .112                            | 1.250                | 4.70                            |
| .250                 | .188                            | 1.375                | 5.68                            |
| .313                 | .293                            | 1.500                | 6.76                            |
| .375                 | .423                            | 1.750                | 9.21                            |
| .500                 | .752                            | 2.000                | 12.0                            |
| .625                 | 1.17                            | 2.125                | 13.5                            |
| .750                 | 1.69                            | 2.250                | 15.2                            |
| .875                 | 2.30                            | 2.500                | 18.8                            |
| 1.000                | 3.01                            | 3.000                | 27.1                            |
| 1.125                | 3.81                            |                      |                                 |

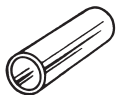
## **MONEL ALLOY 400 COLD DRAWN SEAMLESS PIPE**

**SCHEDULE 40\* – AS DRAWN FINISH**

**ANNEALED TEMPER**

**Stock Lengths – 18 to 20 Feet**

**SPEC ASTM B-165 / SB 165**



| Size<br>in<br>Inches | O.D.  | Wall<br>Thickness | Theo. Weight<br>Per Ft.<br>Lbs. |
|----------------------|-------|-------------------|---------------------------------|
| .250                 | .540  | .088              | .478                            |
| .375                 | .675  | .091              | .639                            |
| .500                 | .840  | .109              | .958                            |
| .750                 | 1.050 | .113              | 1.270                           |
| 1.000                | 1.315 | .133              | 1.890                           |
| 1.250                | 1.660 | .140              | 2.56                            |
| 1.500                | 1.900 | .145              | 3.06                            |
| 2.000                | 2.375 | .154              | 4.11                            |
| 2.500                | 2.875 | .203              | 6.52                            |
| 3.000                | 3.500 | .216              | 8.53                            |
| 3.500                | 4.000 | .226              | 10.30                           |
| 4.000                | 4.500 | .237              | 11.1                            |
| 6.000                | 6.625 | .280              | 21.3                            |

\* Also available in Schedules 10 and 80.

## **MONEL ALLOY R-405**

Monel R-405 – a bar stock – is the standard alloy for a wide variety of precision machined parts for valves, regulators, fire extinguishers and numerous other applications requiring a high degree of corrosion resistance and immunity to rusting.

Machining quality is primarily for automatic screw machine products. Free machinability is related to brittleness, therefore physical properties of Monel R-405 are less than regular Monel. It is not recommended where maximum strength is the prime consideration, such as shafting or tie rods.

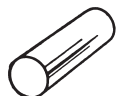
The modification in composition responsible for the free-machining qualities of Monel R-405 has an unimportant effect on its resistance to corrosion. However, regular Monel 400 should be used for all applications involving severe corrosion. In Rod it is only produced in the 'As Drawn' or 'As Rolled' temper.

## **COLD DRAWN ROUNDS**

**AS DRAWN FINISH – AS DRAWN TEMPER**

**Stock Lengths – 6 to 20 Feet**

**SPEC ASTM B-164 / SB 164 QQN 281-CL-B**



| Size in<br>Inches | Theo. Weight<br>per Ft.-Lbs. | Size in<br>Inches | Theo. Weight<br>per Ft.-Lbs. |
|-------------------|------------------------------|-------------------|------------------------------|
| .188 dia.         | .112                         | 1.000             | 3.01                         |
| .250              | .188                         | 1.250             | 4.70                         |
| .500              | .752                         | 1.375             | 5.68                         |
| .625              | 1.17                         | 1.500             | 6.76                         |
| .750              | 1.69                         | 2.500             | 18.8                         |
| .845              | 2.30                         | 2.750             | 22.7                         |



## MONEL ALLOY K-500

Monel Alloy K-500 is a corrosion resistant wrought alloy of nickel, copper and aluminum that can be age hardened by heat treatment. It is available in strip, rod, wire, sheet, plate and tubing and possesses the excellent corrosion resistance which is characteristic of Monel, together with the added advantage of greater strength and hardness. Monel Alloy K-500 has the higher strength ordinarily found only in heat treated alloy steels, and not offered by other corrosion resistant alloys available at comparable price levels.

Before heat treatment for hardness it is readily formed by bending, drawing, machining, etc., and may be joined by welding.

Monel Alloy K-500 is non-magnetic at temperatures above minus 210° Fahrenheit.

### COLD DRAWN ROUNDS

COLD DRAWN TEMPER AND / OR  
AGE HARDENED TEMPER

*Stock Lengths – 6 to 20 Feet*

*SPEC ASTM B-164 / SB 164 QQN 286-CL-A*



| Size in<br>Inches | Theo. Weight<br>per Ft.-Lbs. | Size in<br>Inches | Theo. Weight<br>per Ft.-Lbs. |
|-------------------|------------------------------|-------------------|------------------------------|
| .500 dia.         | 0.718                        | 1.625 dia.        | 7.61                         |
| .625              | 1.12                         | 1.750             | 8.83                         |
| .750              | 1.62                         | 1.875             | 10.20                        |
| .875              | 2.21                         | 2.000             | 11.50                        |
| 1.000             | 2.89                         | 2.125             | 13.04                        |
| 1.125             | 3.65                         | 2.250             | 14.58                        |
| 1.250             | 4.51                         | 2.500             | 18.03                        |
| 1.375             | 5.45                         | 2.750             | 21.77                        |
| 1.500             | 6.48                         | 3.000             | 26.00                        |

# INCONEL ALLOY 600

## (72% Nickel – 15% Chromium)

For Service Temperatures up to 2150°F.

### STRENGTH:

Inconel Alloy 600 has good strength at high temperatures and retains usable strength even at 2150°F. Consequently light, fabricated equipment of Inconel 600 can do the job of heavier equipment of other materials – and save heating costs in the process.

### ATMOSPHERES:

Inconel 600 is used successfully to resist oxidation up to 2150°F. Because of the high nickel content it also has good resistance to reducing, carburizing or nitriding atmospheres. It is a structurally stable alloy. For these reasons Inconel 600 equipment has unusually long service life in most furnace and heat-treating applications.

### THERMAL PROPERTIES:

The thin, tightly adherent film which give Inconel 600 its protection against oxidation can withstand severe thermal shock without spalling. This, combined with the low coefficient of expansion of Inconel 600 enables the alloy to withstand sudden cooling without cracking or spalling.

### DESIGN:

The ease in fabricating this wrought alloy enables you to design equipment for efficient operation. Inconel 600 can be worked either hot or cold, is commercially machinable, and can be welded by any of the commonly used processes.

## INCONEL ALLOY 600 HOT ROLLED PLATE

HOT ROLLED FINISH – ANNEALED AND DESCALED

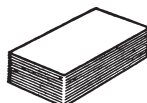
SPEC ASTM B-168 / SB 168

| Thickness<br>Inches | Size<br>Inches | Billing Weight<br>per Sq. Ft.<br>Lbs. | Billing Weight<br>per Plate<br>Lbs. |
|---------------------|----------------|---------------------------------------|-------------------------------------|
| .188                | 72 x 180       | 8.496                                 | 764                                 |
| .250                | 72 x 180       | 11.376                                | 1024                                |
| .375                | 48 x 120       | 16.848                                | 674                                 |
|                     | 72 x 180       |                                       | 1516                                |
| .500                | 48 x 120       | 22.464                                | 899                                 |
|                     | 72 x 180       |                                       | 2022                                |
| .750                | 48 x 120       | 33.696                                | 1348                                |
| 1.000               | 48 x 120       | 44.928                                | 1797                                |
| 1.250               | 48 x 120       | 56.16                                 | 2246                                |

# INCONEL ALLOY 600 COLD ROLLED SHEET

ANNEALED TEMPER

SPEC ASTM B-168 / SB 168 AMS 5540



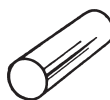
| Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. F.-Lbs. | Theo. Weight<br>per Sheet-Lbs. |
|---------------------|----------------|---------------------------------|--------------------------------|
| .025                | 36 x 96        | 1.102                           | 26                             |
|                     | 48 x 120       |                                 | 44                             |
| .031                | 36 x 96        | 1.366                           | 33                             |
|                     | 48 x 120       |                                 | 62                             |
| .037                | 36 x 96        | 1.630                           | 39                             |
|                     | 48 x 120       |                                 | 66                             |
| .050                | 36 x 96        | 2.203                           | 53                             |
|                     | 48 x 120       |                                 | 109                            |
| .078                | 36 x 96        | 3.437                           | 82                             |
|                     | 48 x 120       |                                 | 137                            |
| .093                | 36 x 96        | 4.098                           | 98                             |
|                     | 48 x 120       |                                 | 173                            |
| .109                | 36 x 144       | 4.803                           | 192                            |
|                     | 48 x 120       |                                 | 132                            |
| .125                | 36 x 96        | 5.508                           | 220                            |
|                     | 48 x 120       |                                 | 330                            |
| .187                | 48 x 120       | 8.240                           | 441                            |
|                     | 48 x 120       |                                 |                                |

# INCONEL ALLOY 600 HOT FINISHED BAR

HOT FINISHED PICKLED & ANNEALED

Stock Lengths – 6 to 20 Feet

SPEC ASTM B-166 / SB 166 AMS 5665



| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| ¼ dia.               | .179                            | 1¼ dia.              | 4.502                           |
| ⅜                    | .403                            | 1½                   | 6.442                           |
| ½                    | .716                            | 2                    | 11.542                          |
| ¾                    | 1.611                           | 3                    | 26.23                           |
| 1                    | 2.869                           | 3¼                   | 30.50                           |

# INCONEL ALLOY 600

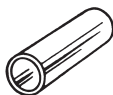
## COLD DRAWN SEAMLESS PIPE

SCHEDULE 40 – PICKLED FINISH

ANNEALED TEMPER

Stock Lengths – 18 to 20 Feet

SPEC ASTM B-167 / SB 167



| Size<br>in<br>Inches | O.D.  | Wall<br>Thickness | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|-------|-------------------|---------------------------------|
| 1/4                  | .540  | .088              | .456                            |
| 3/8                  | .675  | .091              | .609                            |
| 1/2                  | .840  | .109              | .913                            |
| 3/4                  | 1.050 | .113              | 1.210                           |
| 1                    | 1.315 | .133              | 1.801                           |
| 1 1/4                | 1.660 | .140              | 2.440                           |
| 1 1/2                | 1.900 | .145              | 2.916                           |
| 2                    | 2.375 | .154              | 3.917                           |
| 2 1/2                | 2.875 | .203              | 6.214                           |
| 3                    | 3.500 | .216              | 8.129                           |
| 3 1/2                | 4.000 | .226              | 9.816                           |
| 4                    | 4.500 | .237              | 11.531                          |

## INCONEL ALLOY 601

(60% Nickel – 23% Chromium – 14% Iron)

This alloy, a modification of Inconel Alloy 600, is designed to give improved performance in high temperature applications. The cost is approximately 10% less, and in addition the weight of Inconel 601 is 4% less than Inconel 600.

Generally speaking, Inconel 601 can be substituted with advantage for Inconel 600 in heat resistant applications. Substitution in corrosive environments should be investigated.

## INCONEL ALLOY 601

### HOT ROLLED PLATE

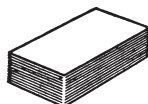
HOT ROLLED FINISH – ANNEALED TEMPER

| Thickness<br>Inches | Size<br>Inches | Billing Weight<br>per Sq. Ft.<br>Lbs. | Billing Weight<br>per Plate<br>Lbs. |
|---------------------|----------------|---------------------------------------|-------------------------------------|
| .188                | 72 x 180       | 8.405                                 | 756                                 |
| .250                | 72 x 180       | 11.102                                | 992                                 |
| .375                | 48 x 120       | 16.495                                | 660                                 |
|                     | 72 x 180       |                                       | 1485                                |
| .500                | 48 x 120       | 31.784                                | 871                                 |
|                     | 72 x 180       |                                       | 1961                                |

# INCONEL ALLOY 601

## COLD ROLLED SHEET

ANNEALED – PICKLED



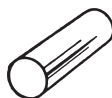
| Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. F.-Lbs. | Theo. Weight<br>per Sheet-Lbs. |
|---------------------|----------------|---------------------------------|--------------------------------|
| .050                | 48 x 120       | 2.108                           | 84                             |
| .062                | 36 x 96        | 2.615                           | 63                             |
|                     | 48 x 120       |                                 | 105                            |
| .078                | 48 x 120       | 3.289                           | 132                            |
| .125                | 36 x 96        | 5.272                           | 127                            |
|                     | 48 x 120       |                                 | 211                            |
| .140                | 48 x 120       | 5.904                           | 236                            |
| .187                | 48 x 120       | 7.887                           | 315                            |
| .250                | 48 x 120       | 10.544                          | 422                            |

# INCONEL ALLOY 601

## HOT FINISHED BAR

HOT FINISHED – ANNEALED TEMPER

Stock Lengths – 6 to 20 Feet



| Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. F.-Lbs. | Theo. Weight<br>per Sheet-Lbs. |
|---------------------|----------------|---------------------------------|--------------------------------|
| ¼ dia.              | .172           | ¾ dia.                          | 1.556                          |
| ⅝ <sub>16</sub>     | .270           | 1                               | 2.763                          |
| ¾                   | .388           | 1¼                              | 4.310                          |
| ½                   | .690           | 1½                              | 6.208                          |
| ⅝                   | 1.078          | 2                               | 11.052                         |

## INCONEL ALLOY 601 COLD DRAWN SEAMLESS PIPE

SCHEDULE 40 – PICKLED FINISH –  
ANNEALED TEMPER



*Stock Lengths – 18 to 20 Feet*

| Size<br>in<br>Inches | O.D.  | Wall<br>Thickness | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|-------|-------------------|---------------------------------|
| 1/4                  | .540  | .088              | .456                            |
| 1/2                  | .840  | .109              | .913                            |
| 3/4                  | 1.050 | .113              | 1.210                           |
| 1                    | 1.315 | .133              | 1.801                           |
| 1 1/4                | 1.660 | .140              | 2.440                           |
| 1 1/2                | 1.900 | .145              | 2.916                           |
| 2                    | 2.375 | .154              | 3.917                           |
| 2 1/2                | 2.875 | .203              | 6.214                           |
| 3                    | 3.500 | .216              | 8.129                           |

### *Welding – A Maintenance Saver*

Welding can save many pieces of valuable equipment from the slag-heap. See list of nickel alloy welding electrodes available.

## INCONEL ALLOY 625 (61% Nickel – 22% Chrome – 9% Moly)

Inconel 625 has excellent corrosion resistance, high strength and oxidation resistance. It is resistant to a wide variety of corrosive media including phosphoric acid, organic acids, sea water and pollution control environments. Inconel 625 resists stress-corrosion cracking and intergranular attack.

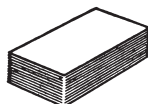
Typical applications for this alloy are wet scrubbers, marine equipment, thrust reversers (aircraft), transition ducts (gas turbine), heat exchangers, towers reaction vessels, liners and agitators.

Inconel 625 is readily fabricated by common industrial processes and has excellent weldability qualities requiring no postweld thermal treatment for maintenance of its corrosion resistance.

## INCONEL ALLOY 625 COLD ROLLED SHEET

PICKLED FINISH – ANNEALED TEMPER

SPEC ASTM B-443 / SB 443 AMS 5599



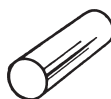
| Thickness<br>Inches | Size<br>in<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------------|-------------------------------------|-----------------------------------|
| .016                | 36 x 96              | 0.703                               | 17                                |
| .025                | 36 x 96              | 1.098                               | 26                                |
| .031                | 36 x 96              | 1.362                               | 33                                |
| .040                | 36 x 96              | 1.757                               | 42                                |
| .050                | 36 x 96              | 2.196                               | 53                                |
| .062                | 36 x 96              | 2.723                               | 65                                |
| .078                | 36 x 96              | 3.426                               | 82                                |
| .093                | 48 x 120             | 4.085                               | 163                               |
| .120                | 48 x 120             | 5.270                               | 211                               |
| .188                | 48 x 120             | 8.257                               | 330                               |
| .250                | 48 x 120             | 10.980                              | 439                               |

## INCONEL ALLOY 625 HOT FINISHED BAR

PICKLED FINISH – ANNEALED TEMPER

Stock Lengths – 6 to 20 Feet

SPEC ASTM B-446 / SB 446 AMS 5666



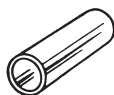
| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| $\frac{1}{2}$        | .718                            | $1\frac{1}{2}$       | 6.464                           |
| $\frac{3}{4}$        | 1.621                           |                      |                                 |
| 1                    | 2.877                           | 2                    | 11.508                          |

## INCONEL ALLOY 625 COLD DRAWN SEAMLESS PIPE

SCHEDULE 40

PICKLED FINISH – ANNEALED TEMPER

Stock Lengths – 18 to 20 Feet



| Size<br>in<br>Inches | O.D.  | Wall<br>Thickness | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|-------|-------------------|---------------------------------|
| .500                 | .840  | .109              | .916                            |
| .750                 | 1.050 | .113              | 1.217                           |
| 1.000                | 1.315 | .133              | 1.807                           |
| 1.500                | 1.900 | .145              | 2.926                           |
| 2.000                | 2.375 | .154              | 3.932                           |

## INCONEL ALLOY 718

Inconel Alloy 718 is an age-hardenable high strength alloy suitable for service at temperatures from -423° to 1300°F. The fatigue strength of alloy 718 is high, and the alloy exhibits excellent stress-rupture properties up to 1300°F as well as oxidation resistance up to 1800°F. It also offers good corrosion resistance to a wide variety of environments. The outstanding characteristic of alloy 718 is its slow response to age hardening. The slow response enables the material to be welded and annealed with no spontaneous hardening unless cooled slowly. Inconel alloy 718 can also be repair-welded in the fully aged condition.

Typical applications are – jet engines; pump bodies and parts; rocket motors and thrust reversers; space craft.

### INCONEL ALLOY 718 COLD ROLLED SHEET

COLD ROLLED FINISH – ANNEALED TEMPER

*SPEC AMS-5596*

| Thickness<br>Inches | Size<br>in<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------------|-------------------------------------|-----------------------------------|
| .025                | 36 x 96              | 1.066                               | 26                                |
| .031                | 36 x 96              | 1.321                               | 32                                |
| .035                | 36 x 96              | 1.492                               | 36                                |
| .040                | 36 x 96              | 1.705                               | 41                                |
| .050                | 36 x 96              | 2.131                               | 51                                |
| .063                | 36 x 96              | 2.685                               | 64                                |

### INCONEL ALLOY 718 HOT FINISHED BAR

SOLUTION ANNEALED – ROUGH TURNED

*SPEC AMS-5662*

| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| $\frac{13}{16}$ "    | 1.85                            | 2 $\frac{1}{4}$ "    | 14.1                            |



## INCONEL ALLOY X-750

INCONEL alloy X-750 is an age-hardenable, non-magnetic nickel-chromium alloy used for its corrosion and oxidation resistance and high creep-rupture strength up to 1500°F. The alloy is made age-hardenable by the addition of aluminum and titanium, which combined with nickel, following proper heat treatment, to form the intermetallic compound  $\text{Ni}_3(\text{Al}, \text{Ti})$ . Alloy X-750, originally developed for gas turbines and jet engines, has been adopted for a wide variety of other uses because of its extremely favorable combination of properties. Excellent relaxation resistance makes INCONEL alloy X-750 suitable for springs operating at temperatures up to about 1200°F. The material also exhibits good strength and ductility at temperatures as low as -423°F. Alloy X-750 also exhibits high resistance to chloride-ion stress-corrosion cracking even in the fully age-hardened condition.

Typical applications are – gas turbine parts - aviation and industrial; springs - steam service, nuclear reactors; bolts; vacuum envelopes; heat-treating fixtures; extrusion dies; aircraft sheet; bellows; forming tools.

### INCONEL ALLOY X-750 COLD ROLLED SHEET

ANNEALED TEMPER

*SPEC AMS-5542*

| Thickness<br>Inches | Size<br>in<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------------|-------------------------------------|-----------------------------------|
| .025                | 36 x 96              | 1.076                               | 26                                |
| .032                | 36 x 96              | 1.378                               | 33                                |
| .035                | 36 x 96              | 1.507                               | 36                                |
| .040                | 36 x 96              | 1.722                               | 41                                |
| .050                | 36 x 96              | 2.153                               | 52                                |
| .078                | 36 x 96              | 3.358                               | 81                                |

### INCONEL ALLOY X-750 HOT ROLLED BAR – ROUGH TURNED

*Stock Lengths – 6 to 20 Feet*

*SPEC AMS-5671 OR AMS 5667*

| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| 1                    | 2.82                            | 2½                   | 17.58                           |
| 1¼                   | 4.40                            | 2¾                   | 19.46                           |
| 1½                   | 6.34                            | 3                    | 25.38                           |

## **INCOLOY ALLOY 800**

### **(32% Nickel – 21% Chromium)**

For Service Temperatures up to 1850°F.

#### ***STRENGTH:***

The high temperature strength of Incoloy 800 compares favorably with that of Inconel 600 up to about 1850°F. Creep- and stress-rupture data for Incoloy bear out the suitability of Incoloy 800 in applications where you need substantial strength in this temperature range. Consequently Incoloy's strength gives you the same benefits of light, wrought alloy equipment which result from the use of Inconel 600.

#### ***ATMOSPHERES:***

Incoloy's resistance to oxidation is of the same high order as its companion alloy, and it has greater resistance to attack by sulfur, green rot, and molten cyanide salts. Incoloy also has good resistance to carburization, but it is somewhat less resistant than Inconel 600 to nitriding atmospheres.

#### ***THERMAL PROPERTIES:***

Incoloy's coefficient of expansion is slightly greater than that of Inconel 600 but the difference is insufficient to cause cracking or spalling of Incoloy's tightly adherent protective oxide.

#### ***DESIGN:***

When you use Incoloy 800 you get all of the advantages of fabricated construction. Incoloy has good workability and may be readily welded. It also gives you the opportunity to design your fixtures and parts for maximum efficiency.

## **INCOLOY ALLOY 825**

Incoloy alloy 825 was developed to handle certain corrosive conditions of unusual severity. It answers a need not filled by any of the other Inco Alloys in that it has the specific ability to withstand certain hot acids and oxidizing chemicals; it also has high resistance to other conditions.

Available in all wrought mill forms.

The approximate composition is as follows:

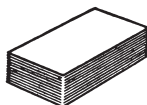
|                  |       |                 |       |
|------------------|-------|-----------------|-------|
| Nickel .....     | 40. % | Copper .....    | 1.75% |
| Chromium .....   | 21.   | Manganese ..... | .60   |
| Iron .....       | 31.   | Silicon .....   | .40%  |
| Molybdenum ..... | 3.    | Carbon .....    | .05   |

Its relatively high nickel content plus molybdenum and copper make the alloy considerably more resistant to reducing conditions such as hot sulfuric, sulfurous and phosphoric acid solutions than any of the common stainless steels. The chromium content is sufficient so that when fortified with nickel, the alloy is resistant to a wide variety of oxidizing chemicals such as nitric acid solutions, nitrates, and cupric, ferric and mercuric salts, except chlorides. With this combination of properties, Incoloy Alloy 825 is expected to find many useful applications.

## INCOLOY ALLOY 825 COLD ROLLED SHEET

PICKLED FINISH – ANNEALED TEMPER

SPEC ASTM B-424 / SB 424



| Thickness<br>Inches | Size<br>in<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------------|-------------------------------------|-----------------------------------|
| .062                | 48 x 120             | 2.626                               | 105                               |
| .125                | 48 x 120             | 5.294                               | 212                               |
| .187                | 48 x 120             | 7.920                               | 317                               |
| .250                | 48 x 120             | 10.588                              | 424                               |

## INCOLOY ALLOY 825 HOT FINISHED BAR

PICKLED FINISH – ANNEALED TEMPER

Stock Lengths – 6 to 20 Feet

SPEC ASTM B-425 / SB 425



| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| 1/2                  | .684                            | 1 1/2                | 6.233                           |
| 3/4                  | 1.558                           |                      |                                 |
| 1                    | 2.775                           | 2                    | 11.064                          |

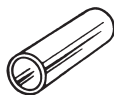
## INCOLOY ALLOY 825 COLD DRAWN SEAMLESS PIPE

SCHEDULE 40

PICKLED FINISH – ANNEALED TEMPER

Stock Lengths – 18 to 20 Feet

SPEC ASTM B-423 / SB 423



| Size<br>in<br>Inches | O.D.  | Wall<br>Thickness | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|-------|-------------------|---------------------------------|
| .500                 | .840  | .109              | .883                            |
| .750                 | 1.050 | .113              | 1.174                           |
| 1.000                | 1.315 | .133              | 1.742                           |
| 1.500                | 1.900 | .145              | 2.82                            |
| 2.000                | 2.375 | .154              | 3.79                            |

## NOMINAL CHEMICAL COMPOSITION,<sup>a</sup> %

| Designation                       | Ni                | C    | Mn     | Fe    | S      | Si     |
|-----------------------------------|-------------------|------|--------|-------|--------|--------|
| <b>Nickel Alloys</b>              |                   |      |        |       |        |        |
| Nickel 200                        | 99.5 <sup>b</sup> | 0.08 | 0.2    | 0.2   | 0.005  | 0.2    |
| Nickel 201                        | 99.5 <sup>b</sup> | 0.01 | 0.2    | 0.2   | 0.005  | 0.2    |
| Nickel 205                        | 99.5 <sup>b</sup> | 0.08 | 0.2    | 0.1   | 0.004  | 0.08   |
| Nickel 211                        | 95.0 <sup>b</sup> | 0.1  | 4.8    | 0.4   | 0.008  | 0.08   |
| Nickel 220                        | 99.5 <sup>b</sup> | 0.04 | 0.1    | 0.05  | 0.004  | 0.03   |
| Nickel 230                        | 99.5 <sup>b</sup> | 0.05 | 0.08   | 0.05  | 0.004  | 0.02   |
| Nickel 270                        | 99.98             | 0.01 | <0.001 | 0.003 | <0.001 | <0.001 |
| DURANICKEL alloy 301              | 96.5 <sup>b</sup> | 0.2  | 0.2    | 0.3   | 0.005  | 0.5    |
| PERMANICKEL alloy 300             | 98.5 <sup>b</sup> | 0.2  | 0.2    | 0.3   | 0.005  | 0.2    |
| <b>MONEL Nickel-Copper Alloys</b> |                   |      |        |       |        |        |
| MONEL alloy 400                   | 66.5 <sup>b</sup> | 0.2  | 1.0    | 1.2   | 0.01   | 0.2    |
| MONEL alloy 404                   | 54.5 <sup>b</sup> | 0.08 | 0.05   | 0.2   | 0.01   | 0.05   |
| MONEL alloy R-405                 | 66.5 <sup>b</sup> | 0.2  | 1.0    | 1.2   | 0.04   | 0.2    |
| MONEL alloy K-500                 | 66.5 <sup>b</sup> | 0.1  | 0.8    | 1.0   | 0.005  | 0.2    |
| MONEL alloy 502                   | 66.5 <sup>b</sup> | 0.05 | 0.8    | 1.0   | 0.005  | 0.2    |
| <b>MONEL Copper-Nickel Alloy</b>  |                   |      |        |       |        |        |
| MONEL alloy 401                   | 42.5 <sup>b</sup> | 0.05 | 1.6    | 0.4   | 0.008  | 0.1    |

## NOMINAL CHEMICAL COMPOSITION,<sup>a</sup> %

| Designation                       | Cu     | Cr     | Al   | Ti     | Others                 |
|-----------------------------------|--------|--------|------|--------|------------------------|
| <b>Nickel Alloys</b>              |        |        |      |        |                        |
| Nickel 200                        | 0.1    | —      | —    | —      | —                      |
| Nickel 201                        | 0.1    | —      | —    | —      | —                      |
| Nickel 205                        | 0.08   | —      | —    | 0.03   | Mg 0.05                |
| Nickel 211                        | 0.1    | —      | —    | —      | —                      |
| Nickel 220                        | 0.05   | —      | —    | 0.03   | Mg 0.05                |
| Nickel 230                        | 0.05   | —      | —    | 0.003  | Mg 0.06                |
| Nickel 270                        | <0.001 | <0.001 | —    | <0.001 | Co <0.001<br>Mg <0.001 |
| DURANICKEL alloy 301              | 0.1    | —      | 4.4  | 0.6    | —                      |
| PERMANICKEL alloy 300             | 0.1    | —      | —    | 0.4    | Mg 0.4                 |
| <b>MONEL Nickel-Copper Alloys</b> |        |        |      |        |                        |
| MONEL alloy 400                   | 31.5   | —      | —    | —      | —                      |
| MONEL alloy 404                   | 44.0   | —      | 0.03 | —      | —                      |
| MONEL alloy R-405                 | 31.5   | —      | —    | —      | —                      |
| MONEL alloy K-500                 | 29.5   | —      | 2.7  | 0.6    | —                      |
| MONEL alloy 502                   | 28.0   | —      | 3.0  | 0.2    | —                      |
| <b>MONEL Copper-Nickel Alloy</b>  |        |        |      |        |                        |
| MONEL alloy 401                   | Bal.   | —      | —    | —      | —                      |

## NOMINAL CHEMICAL COMPOSITION,<sup>a</sup> %

| Description                                | Ni                | C    | Mn  | Fe   | S     | Si   |
|--|-------------------|------|-----|------|-------|------|
| <b>INCONEL Nickel-Chromium Alloys</b>      |                   |      |     |      |       |      |
| INCONEL alloy 600                          | 76.0 <sup>b</sup> | 0.08 | 0.5 | 8.0  | 0.008 | 0.2  |
| INCONEL alloy 601                          | 60.5              | 0.05 | 0.5 | 14.1 | 0.007 | 0.2  |
| INCONEL alloy 625                          | 61.0 <sup>b</sup> | 0.05 | 0.2 | 2.5  | 0.008 | 0.2  |
| INCONEL alloy 702                          | 79.5 <sup>b</sup> | 0.05 | 0.5 | 1.0  | 0.005 | 0.4  |
| INCONEL alloy 706                          | 41.5              | 0.03 | 0.2 | 40.0 | 0.008 | 0.2  |
| INCONEL alloy 718                          | 52.5              | 0.04 | 0.2 | 18.5 | 0.008 | 0.2  |
| INCONEL alloy 721                          | 71.0 <sup>b</sup> | 0.04 | 2.2 | 6.5  | 0.005 | 0.08 |
| INCONEL alloy 722                          | 75.0 <sup>b</sup> | 0.04 | 0.5 | 7.0  | 0.005 | 0.4  |
| INCONEL alloy X-750                        | 73.0 <sup>b</sup> | 0.04 | 0.5 | 7.0  | 0.005 | 0.2  |
| INCONEL alloy 751                          | 72.5 <sup>b</sup> | 0.05 | 0.5 | 7.0  | 0.005 | 0.2  |
| <b>INCOLOY Nickel-Iron-Chromium Alloys</b> |                   |      |     |      |       |      |
| INCOLOY alloy 800                          | 32.5              | 0.05 | 0.8 | 46.0 | 0.008 | 0.5  |
| INCOLOY alloy 801                          | 32.0              | 0.05 | 0.8 | 44.5 | 0.008 | 0.5  |
| INCOLOY alloy 802                          | 32.5              | 0.4  | 0.8 | 46.0 | 0.008 | 0.4  |
| INCOLOY alloy 804                          | 41.0              | 0.05 | 0.8 | 25.4 | 0.008 | 0.4  |
| INCOLOY alloy 825                          | 42.0              | 0.03 | 0.5 | 30.0 | 0.02  | 0.2  |
| NI-SPAN-C alloy 902                        | 42.2              | 0.03 | 0.4 | 48.5 | 0.02  | 0.5  |

| Description                                | Cu  | Cr   | Al  | Ti  | Others                |
|--|-----|------|-----|-----|-----------------------|
| <b>INCONEL Nickel-Chromium Alloys</b>      |     |      |     |     |                       |
| INCONEL alloy 600                          | 0.2 | 15.5 | —   | —   | —                     |
| INCONEL alloy 601                          | 0.5 | 23.0 | 1.4 | —   | —                     |
| INCONEL alloy 625                          | —   | 21.5 | 0.2 | 0.2 | Mo 9.0<br>Cb + Ta 3.6 |
| INCONEL alloy 702                          | 0.2 | 15.5 | 3.2 | 0.6 | —                     |
| INCONEL alloy 706                          | 0.2 | 16.0 | 0.2 | 1.8 | Cb + Ta 2.9           |
| INCONEL alloy 718                          | 0.2 | 19.0 | 0.5 | 0.9 | Mo 3.0<br>Cb + Ta 5.1 |
| INCONEL alloy 721                          | 0.1 | 16.0 | —   | 3.0 | —                     |
| INCONEL alloy 722                          | 0.2 | 15.5 | 0.7 | 2.4 | —                     |
| INCONEL alloy X-750                        | 0.2 | 15.5 | 0.7 | 2.4 | Cb + Ta 1.0           |
| INCONEL alloy 751                          | 0.2 | 15.5 | 1.2 | 2.3 | Cb + Ta 1.0           |
| <b>INCONEL Nickel-Iron-Chromium Alloys</b> |     |      |     |     |                       |
| INCOLOY alloy 800                          | 0.5 | 21.0 | 0.4 | 0.4 | —                     |
| INCOLOY alloy 801                          | 0.5 | 20.5 | —   | 1.1 | —                     |
| INCOLOY alloy 802                          | 0.4 | 21.0 | —   | —   | —                     |
| INCOLOY alloy 804                          | 0.4 | 29.5 | 0.3 | 0.6 | —                     |
| INCOLOY alloy 825                          | 0.2 | 21.5 | 0.1 | 0.9 | Mo 3.0                |
| NI-SPAN-C alloy 902                        | 0.5 | 5.3  | 0.6 | 2.6 | —                     |

a Not for specification purposes.

b Includes cobalt.

## NOMINAL RANGE OF MECHANICAL PROPERTIES, WROUGHT RODS AND BARS

| Designation          | Temper                         | Tensile<br>Strength,<br>1000 psi | Yield Strength<br>0.2% Offset,<br>1000 psi | Elongation<br>in 2 inches,<br>% | Hardness<br>Brinell—<br>3000 KG |
|----------------------|--------------------------------|----------------------------------|--|---------------------------------|---------------------------------|
| Nickel 200           | Hot Finished                   | 60-85                            | 15-45                                      | 55-35                           | 90-150                          |
|                      | Cold Drawn                     | 65-110                           | 40-100                                     | 35-10                           | 140-230                         |
|                      | Annealed                       | 55-80                            | 15-30                                      | 55-40                           | 90-120                          |
| Nickel 201           | Hot Finished                   | 50-60                            | 10-25                                      | 60-40                           | 75-100                          |
|                      | Cold Drawn                     | 60-100                           | 35-90                                      | 35-10                           | 125-200                         |
|                      | Annealed                       | 55-60                            | 10-25                                      | 60-40                           | 75-100                          |
| DURANICKEL alloy 301 | Hot Finished                   | 90-130                           | 35-90                                      | 55-30                           | 140-240                         |
|                      | Hot Finished,<br>Age-Hardened  | 160-200                          | 115-150                                    | 30-15                           | 300-375                         |
|                      | Cold Drawn,<br>As Drawn        | 110-150                          | 60-130                                     | 35-15                           | 185-300                         |
|                      | Cold Drawn,<br>Age-Hardened    | 170-210                          | 125-175                                    | 25-15                           | 300-380                         |
|                      | Annealed                       | 90-120                           | 30-60                                      | 55-35                           | 135-185                         |
|                      | Annealed,<br>Age-Hardened      | 150-190                          | 110-140                                    | 30-20                           | 285-360                         |
|                      |                                |                                  |  |                                 |                                 |
| MONEL alloy 400      | Hot Finished                   | 80-95                            | 40-65                                      | 45-30                           | 140-185                         |
|                      | Cold Drawn,<br>Stress-Relieved | 84-120                           | 55-100                                     | 35-22                           | 160-225                         |
|                      | Annealed                       | 70-85                            | 25-40                                      | 50-35                           | 110-140                         |
| MONEL alloy R-405    | Hot Finished                   | 75-90                            | 35-60                                      | 45-30                           | 130-170                         |
|                      | Cold Drawn                     | 85-115                           | 50-100                                     | 35-15                           | 160-240                         |
|                      | Annealed                       | 70-85                            | 25-40                                      | 50-35                           | 110-140                         |
| MONEL alloy K-500    | Hot Finished                   | 90-135                           | 40-110                                     | 45-20                           | 140-260                         |
|                      | Hot Finished,<br>Age-Hardened  | 140-170                          | 100-125                                    | 30-17                           | 265-330                         |
|                      | Annealed                       | 90-110                           | 40-60                                      | 45-25                           | 140-185                         |
|                      | Annealed,<br>Age-Hardened      | 130-160                          | 85-110                                     | 30-20                           | 250-300                         |
|                      | Cold Drawn                     | 100-135                          | 70-100                                     | 35-13                           | 175-260                         |
|                      | Cold Drawn,<br>Age-Hardened    | 135-180                          | 95-130                                     | 30-15                           | 255-325                         |
|                      |                                |                                  |  |                                 |                                 |
|                      |                                |                                  |  |                                 |                                 |
| INCONEL alloy 600    | Hot Finished                   | 85-120                           | 35-90                                      | 50-30                           | 140-217                         |
|                      | Cold Drawn                     | 105-150                          | 80-125                                     | 30-10                           | 180-300                         |
|                      | Annealed                       | 80-100                           | 30-50                                      | 55-35                           | 120-170                         |
| INCOLOY alloy 800    | Hot Finished                   | 85-120                           | 35-90                                      | 50-25                           | 140-217                         |
|                      | Cold Drawn                     | 100-150                          | 75-125                                     | 30-10                           | 180-300                         |
|                      | Annealed                       | 70-100                           | 30-50                                      | 50-30                           | 120-170                         |
| INCOLOY alloy 825    | Annealed                       | 85-105                           | 35-65                                      | 50-30                           | 120-180                         |

# INCO ALLOYS WELDING PRODUCTS

| PRODUCT   | RECOMMENDED FOR:   |
|---|--|
| <b>Copper-Nickel Welding Electrode (Metal-Arc Welding)</b>                            |  |
| MONEL<br>Electrode 187  | Wrought or cast 70/30, 80/20 & 90/10 copper-nickel alloys to themselves or each other.   |
| <b>Nickel &amp; Nickel-Iron Electrodes for Welding Cast Irons (Metal-Arc Welding)</b> |  |
| NI-ROD<br>Welding Electrode   | Welding cast iron, particularly thin sections or when maximum machinability is required.   |
| NI-ROD 55<br>Welding Electrode  | Welding cast irons, ductile iron, Ni-Resist corrosion-resisting iron, and welding cast irons to various wrought alloys. Particularly useful for heavy sections and high-phosphorus irons.  |
| <b>Nickel &amp; Alloy Welding Electrodes (Metal-Arc Welding)</b>                      |  |
| INCONEL<br>Welding Electrode 132  | INCONEL alloy 600 to itself.   |
| MONEL<br>Welding Electrode 134  | MONEL alloy K-500. Weld will age harden.   |
| INCOLOY<br>Welding Electrode 135  | INCOLOY (nickel-iron-chromium) alloy 825 and similar alloys to themselves.   |
| Nickel<br>Welding Electrode 141   | Nickel 200 & 201 to themselves or to each other; clad side of Nickel 200 or 201 clad steel; overlaying on steel; and welding Nickel 200 or 201 to steel.   |
| INCONEL<br>Welding Electrode 182  | INCONEL alloy 600 to itself or to carbon or stainless steels. Meets stringent radiographic requirements in all positions.  |
| MONEL<br>Welding Electrode 190  | MONEL alloys 400 & 404 to themselves, to each other, to carbon steel or for overlaying on steel. Meets stringent radiographic requirements in all positions.   |
| INCO-WELD A<br>Welding Electrode  | Dissimilar alloys such as austenitic and ferritic steels to each other or to high-nickel alloys. Also, INCOLOY alloy 800 to itself and for welding 9% nickel steel.  |
| INCO-WELD B<br>Welding Electrode  | A.C. (alternating current) welding of 9% nickel steel. Also for welding dissimilar alloys such as austenitic and ferritic steels to each other or to high-nickel alloys where A.C. operability is preferred.   |
| INCONEL<br>Welding Electrode 112  | INCONEL alloy 625 to itself, and for joining many dissimilar combinations of nickel-base or nickel-containing alloys, and for high-strength welds in 9% nickel steel.  |
| <b>Nickel &amp; Nickel Alloy Bare Welding Rods and Electrodes</b>                     |  |
| MONEL<br>Filler Metal 60**  | TIG or MIG welding MONEL alloys 400 & 404 to themselves or each other. MIG overlay on steel after first layer of Nickel Filler Metal 61. Use with INCOFLUX 5 Submerged Arc Flux for joining alloy 400 to itself or for overlaying on steel without nickel barrier layer. |
| Nickel Filler Metal**   | TIG or MIG welding Nickel 200 or 201 to themselves or each other, or overlaying on steel.  |
| INCONEL<br>Filler Metal 62**  | TIG or MIG welding INCONEL alloy 600. Use with INCOFLUX 4 Submerged Arc Flux for joining alloy 600.  |
| MONEL<br>Filler Metal 64  | TIG or MIG welding MONEL alloy K-500. Weld will age harden.  |
| INCOLOY<br>Filler Metal 65  | TIG or MIG welding INCOLOY alloy 825.  |

Cont'd

## INCO ALLOYS WELDING PRODUCTS

| PRODUCT                       | RECOMMENDED FOR:  |
|-------------------------------|---|
| INCONEL<br>Filler Metal 69    | TIG welding INCONEL alloys 722 and X-750.<br>Weld will age harden.  |
| INCONEL<br>Filler Metal 82**  | TIG and MIG welding INCONEL alloy 600 and INCOLOY alloy 800 to themselves or to stainless or carbon steels; for overlaying on steel. Use with INCOFLUX 4 Submerged Arc Flux for joining alloys 600 & 800 and 9% nickel steel to themselves, or for overlaying on steel. |
| INCONEL<br>Filler Metal 92    | TIG and MIG dissimilar alloys such as austenitic and ferritic steels to each other and to high-nickel alloys. Overlaying on steel and welding 9% nickel steel. Weld deposits will respond to age-hardening procedures.  |
| INCONEL<br>Filler Metal 625** | TIG and MIG welding INCONEL alloy 625 and for high-strength welds in 9% nickel steel; also for joining many dissimilar combinations of nickel-base or nickel-containing alloys.   |
| INCONEL<br>Filler Metal 718   | TIG welding INCONEL alloys 718, 706, and X-750.   |

### Copper-Nickel Alloy Bare Welding Rods and Electrodes

|  |  |
|--|--|
| MONEL<br>Filler Metal 67**<br>(Formerly 70/30<br>Copper-Nickel Filler<br>Metal 67) | TIG & MIG welding 70/30, 80/20 and 90/10 copper-nickel alloys. MIG overlay on steel after first layer of Nickel Filler Metal 61. Use with INCOFLUX 5 for joining copper-nickel alloys. |
|--|--|

Other Welding Products:

\*\*1) INCOFLUX 4, INCOFLUX 5, and INCOFLUX 6 Submerged Arc Fluxes are available for welding with the filler metals indicated above.

2) Filler Metals also available for oxyacetylene welding of nickel and high-nickel alloys.

MONEL, INCONEL, INCOLOY, INCOFLUX, INCO-WELD and NI-ROD are registered trademarks of The International Nickel Company of Canada Ltd.



# ELECTRODES FOR METAL ARC WELDING OF CAST IRONS

NI-ROD

AC OR DC – REVERSE POLARITY

Recommended for repair of Cast Iron, particularly where thin sections are involved or machinability is important. Joining of Cast Iron to Steel, Ferrous Alloys, Nickel Alloys and some Copper Alloys.

| Size<br>in<br>Inches | Length<br>in<br>Inches | Size<br>in<br>Inches | Length<br>in<br>Inches |
|----------------------|------------------------|----------------------|------------------------|
| $\frac{3}{32}$ dia.  | 12                     | $\frac{5}{32}$ dia.  | 14                     |
| $\frac{1}{8}$        | 14                     | $\frac{3}{16}$       | 14                     |

# ELECTRODES FOR METAL ARC WELDING OF CAST IRONS

NI-ROD “55”

AC OR DC – REVERSE POLARITY

Particularly useful for welding heavy sections High Phosphorus Irons, Ductile Iron, Ni-Resist High Strength Cast Irons and for joining Cast Iron to other metals.

| Size<br>in<br>Inches | Length<br>in<br>Inches | Size<br>in<br>Inches | Length<br>in<br>Inches |
|----------------------|------------------------|----------------------|------------------------|
| $\frac{3}{32}$ dia.  | 12                     | $\frac{5}{32}$ dia.  | 14                     |
| $\frac{1}{8}$        | 14                     | $\frac{3}{16}$       | 14                     |

**Packaging:** 5 lb. Tubular Fibre Containers – 10 containers to a carton.

# NICKEL ALLOY ELECTRODES FOR METAL ARC WELDING

| Size<br>in<br>Inches       | Length<br>in<br>Inches | Size<br>in<br>Inches       | Length<br>in<br>Inches |
|----------------------------|------------------------|----------------------------|------------------------|
| <b>Grade INCO WELD “A”</b> |                        | <b>Grade “132” INCONEL</b> |                        |
| $\frac{3}{32}$ dia.        | 9                      | $\frac{3}{32}$ dia.        | 12                     |
| $\frac{1}{8}$              | 12                     | $\frac{1}{8}$              | 12                     |
| $\frac{5}{32}$             | 14                     | $\frac{5}{32}$             | 14                     |
| $\frac{3}{16}$             | 14                     | $\frac{3}{16}$             | 14                     |

## NICKEL ALLOY ELECTRODES FOR METAL ARC WELDING

| Size<br>in<br>Inches       | Length<br>in<br>Inches | Size<br>in<br>Inches                             | Length<br>in<br>Inches |
|----------------------------|------------------------|--|------------------------|
| <b>Grade "112" INCONEL</b> |                        | <b>Grade "182" INCONEL</b>                       |                        |
| $\frac{3}{32}$ dia.        | 12                     | $\frac{3}{32}$ dia.                              | 9                      |
| $\frac{1}{8}$              | 14                     | $\frac{1}{8}$                                    | 12                     |
| $\frac{5}{32}$             | 14                     | $\frac{5}{32}$                                   | 14                     |
| $\frac{3}{16}$             | 14                     | $\frac{3}{16}$                                   | 14                     |
| <b>Grade "141" NICKEL</b>  |                        | <b>Grade "187" 70/30<br/>NICKEL COPPER</b>       |                        |
| $\frac{3}{32}$ dia.        | 12                     | $\frac{3}{32}$ dia.                              | 12                     |
| $\frac{1}{8}$              | 14                     | $\frac{1}{8}$                                    | 14                     |
| $\frac{5}{32}$             | 14                     | $\frac{5}{32}$                                   | 14                     |
| $\frac{3}{16}$             | 14                     | $\frac{3}{16}$                                   | 14                     |
| <b>Grade "135" INCOLOY</b> |                        | <b>Grade "190" MONEL<br/>70/30 NICKEL COPPER</b> |                        |
| $\frac{3}{32}$ dia.        | 12                     | $\frac{3}{32}$ dia.                              | 12                     |
| $\frac{1}{8}$              | 14                     | $\frac{1}{8}$                                    | 14                     |
| $\frac{5}{32}$             | 14                     | $\frac{5}{32}$                                   | 14                     |
| $\frac{3}{16}$             | 14                     | $\frac{3}{16}$                                   | 14                     |

*All above Electrodes packed in 5 lb. and 50 lb. moisture resistant fibre containers.*

## OTHER CORROSION RESISTANT ALLOYS

### AL-904L™ (TM of Allegheny Ludlum)

Austenitic stainless steel alloy for mid to high level of corrosion resistance. Contains high levels of chromium and nickel with molybdenum and copper additions to provide added corrosion resistance in certain media.

Performs well in service scrubbers, acid and fertilizer production.

**A-286** is a heat and corrosion resistant austenitic iron base material which can be age hardened to a high strength level.

### HASTELLOY® alloys

The Hastelloy Alloys are basically high nickel materials developed to resist wear, heat and corrosion. The alloys are widely used in the chemical processing, gas turbine, aerospace, nuclear and metal working industries. One of them may provide the answer to a particular problem that you may have.

Alloys "B-2", C-276 and "X" are available from stock in limited quantities per item. Our inventory is primarily designed to service your maintenance requirements when immediate delivery is often essential. In addition, minimum mill charges can be avoided because of stock availability.

See list of other Hastelloy Alloys available on a mill basis.

## HASTELLOY ALLOY "B-2"

HASTELLOY® alloy B-2 is an improved version of HASTELLOY alloy B. Alloy B-2 has the same excellent corrosion resistance as alloy B, but with improved resistance to knife-line and heat-affected zone attack. This alloy resists the formation of grain-boundary carbide precipitates in the weld heat-affected zone, thus making it suitable for most chemical process applications in the as-welded condition. Alloy B-2 also has excellent resistance to pitting and stress-corrosion cracking.

HASTELLOY alloy B-2 is particularly well suited for equipment handling hydrochloric acid at all concentrations and temperatures including the boiling point. It is also resistant to hydrogen chloride gas, and sulfuric, acetic, and phosphoric acids.

*Alloy B-2 is not recommended in the presence of ferric or cupric salts as these salts may cause rapid corrosion failure. Ferric or cupric salts may develop when hydrochloric acid comes in contact with iron or copper. Therefore when HASTELLOY alloy B-2 is used in conjunction with iron or copper piping in a system containing hydrochloric acid, the presence of these salts could cause alloy B-2 to fail prematurely.*

Exposure of alloy B-2 to temperatures from 1000 deg. F (538 deg. C) to 1500 deg. F (816 deg. C) should be avoided because of a reduction in the ductility of the alloy. In oxidizing gases such as air, alloy B-2 may be used at temperatures up to 1000 deg. F (538 deg. C). In reducing gases or in vacuum, the alloy may be used from 1500 deg. F (816 deg. C) to substantially higher temperatures.

### CHEMICAL COMPOSITION – PERCENT

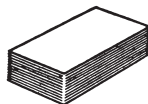
|            |                 |            |               |
|------------|-----------------|------------|---------------|
| Molybdenum | – 26.00 - 30.00 | Manganese  | – 1.00 max.   |
| Iron       | – 2.00 max.     | Carbon     | – .02 max.    |
| Cobalt     | – 1.00 max.     | Vanadium   | – .020 - 0.40 |
| Chromium   | – 1.00 max.     | Phosphorus | – 0.040 max.  |
| Silicon    | – .10 max.      | Sulphur    | – 0.030 max.  |
| Nickel     | – Balance       |            |               |

## HASTELLOY ALLOY "B-2"

HOT ROLLED SHEET AND PLATE

ANNEALED AND PICKLED

SPEC ASTM B-333



| Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------|-------------------------------------|-----------------------------------|
| .125                | 48 x 120       | 5.99                                | 240                               |
| .187                | 48 x 120       | 9.36                                | 374                               |
| .250                | 48 x 120       | 12.38                               | 495                               |
| .375                | 48 x 120       | 18.58                               | 743                               |
| .500                | 48 x 120       | 24.62                               | 985                               |

## HASTELLOY ALLOY "B-2"

HOT ROLLED BAR – ANNEALED

FINISH – Under  $\frac{3}{4}$ " dia. – Pickled

$\frac{3}{4}$ " dia. and over – rough Centreless Ground

**SPEC ASTM B-335**



| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| .375 dia.            | 0.456                           | 1.250 dia.           | 4.97                            |
| .500                 | 0.804                           | 1.500                | 7.15                            |
| .750                 | 1.80                            | 1.750                | 9.72                            |
| 1.000                | 3.19                            | 2.000                | 12.70                           |

## HASTELLOY ALLOY "B-2" PIPE

SCHEDULE 40

**SPECS: WELDED – ASTM B-619 SEAMLESS – ASTM B-622**



| Size<br>in<br>Inches | O.D.<br>Inches | Wall<br>Thickness<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|----------------|-----------------------------|---------------------------------|
| .500                 | .840           | .109                        | 1.02                            |
| .750                 | 1.050          | .113                        | 1.34                            |
| 1.000                | 1.315          | .133                        | 1.94                            |
| 1.500                | 1.900          | .145                        | 3.34                            |
| 2.000                | 2.375          | .154                        | 4.46                            |

## HASTELLOY ALLOY C-276

Hastelloy Alloy C-276 is an improved wrought version of Hastelloy Alloy "C". Hastelloy C-276 has the same excellent corrosion resistance as Alloy "C" with vastly improved fabricability. This alloy resists the formation of grain-boundary precipitates in the weld heat-affected zone, thus, making it suitable for most chemical process applications in the as-welded condition. Alloy C-276 also has excellent resistance to pitting, stress corrosion cracking and to oxidizing atmospheres up to 1900 deg. F.

Hastelloy Alloy C-276 has exceptional resistance to a wide variety of chemical process environments. These include strong oxidizers such as ferric and cupric chlorides, hot contaminated mineral acids, solvents, chlorine and chlorine-contaminated media (organic and inorganic), dry chlorine, formic and acetic acids, acetic anhydride and sea water and brine solutions. It is also one of the few materials that will resist the corrosive effects of wet chlorine gas, hypochlorite and chlorine dioxide solutions.

For additional information ask for booklet H-2002A.

### CHEMICAL COMPOSITION – PERCENT

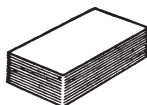
|            |                 |            |             |
|------------|-----------------|------------|-------------|
| Molybdenum | – 15.00 - 17.00 | Manganese  | – 1.00 max. |
| Iron       | – 4.00 - 7.00   | Carbon     | – 0.02 max. |
| Cobalt     | – 2.50 max.     | Vanadium   | – 0.35 max. |
| Chromium   | – 14.50 - 16.50 | Phosphorus | – 0.03 max. |
| Silicon    | – 0.05 max.     | Sulphur    | – 0.03 max. |
| Nickel     | – Balance       |            |             |

## HASTELLOY ALLOY C-276

HOT ROLLED SHEET AND PLATE

ANNEALED AND PICKLED

SPEC ASTM B-575



| Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------|-------------------------------------|-----------------------------------|
| .063                | 48 x 120       | 2.91                                | 116                               |
| .125                | 48 x 120       | 5.78                                | 232                               |
| .187                | 48 x 120       | 8.79                                | 348                               |
| .250                | 48 x 120       | 11.56                               | 463                               |
| .375                | 48 x 120       | 17.33                               | 694                               |
| .500                | 48 x 120       | 23.76                               | 950                               |
| .750                | 48 x 120       | 35.57                               | 1423                              |
| 1.000               | 48 x 120       | 47.38                               | 1895                              |

## HASTELLOY ALLOY C-276/C-22

HOT ROLLED BAR – ANNEALED

FINISH – Under ¾" dia. – Pickled

¾" dia. and larger – rough Centreless Ground

SPEC ASTM B-574

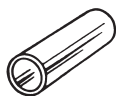


| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| .250                 | 0.189                           | 1.375                | 5.80                            |
| .375                 | 0.424                           | 1.500                | 6.82                            |
| .500                 | 0.770                           | 1.750                | 9.24                            |
| .625                 | 1.21                            | 2.000                | 12.1                            |
| .750                 | 1.69                            | 3.000                | 27.5                            |
| 1.000                | 3.04                            | 3.250                | 32.2                            |
| 1.125                | 3.89                            | 4.000                | 48.4                            |
| 1.250                | 4.74                            | 4.500                | 61.2                            |

## HASTELLOY ALLOY C-276 PIPE

SCHEDULE 40

SPECS: SEAMLESS – ASTM B-622 WELDED - ASTM B-619



| Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. | Size<br>in<br>Inches | Theo. Weight<br>per Ft.<br>Lbs. |
|----------------------|---------------------------------|----------------------|---------------------------------|
| .500                 | .840                            | .109                 | 0.98                            |
| .750                 | 1.050                           | .113                 | 1.30                            |
| 1.000                | 1.315                           | .133                 | 1.93                            |
| 1.500                | 1.900                           | .145                 | 3.23                            |
| 2.00                 | 2.375                           | .154                 | 4.31                            |
| 3.00                 | 3.500                           | .216                 | 8.58                            |

## HASTELLOY ALLOY "X"

Hastelloy Alloy "X" is a nickel-base alloy that possesses exceptional strength and oxidation resistance up to 2200 deg. F. It has also been found to be exceptionally resistant to stress corrosion cracking in petrochemical applications. The alloy has excellent forming and welding characteristics.

Alloy "X" is extensively used in jet engine tailpipes, afterburner components, turbine blades, nozzle vanes, cabin heaters and other aircraft parts.

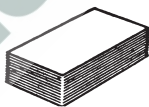
For detailed information ask for bulletin F-30.037H.

### CHEMICAL COMPOSITION – PERCENT

|            |                 |           |               |
|------------|-----------------|-----------|---------------|
| Molybdenum | – 8.00 - 10.00  | Manganese | – 1.00 max.   |
| Iron       | – 17.00 - 20.00 | Carbon    | – 0.05 - 0.15 |
| Cobalt     | – 0.50 - 2.50   | Silicon   | – 1.00 max.   |
| Chromium   | – 20.50 - 23.00 | Tungsten  | – 0.20 - 1.00 |
| Nickel     | – Balance       |           |               |

## HASTELLOY ALLOY "X" SHEET

*SPEC AMS-5536*



| Thickness<br>Inches | Size<br>Inches | Theo. Weight<br>per Sq. Ft.<br>Lbs. | Theo. Weight<br>per Sheet<br>Lbs. |
|---------------------|----------------|-------------------------------------|-----------------------------------|
| 0.0165              | 36 x 96        | 0.725                               | 17.4                              |
| 0.0235              | 36 x 96        | 1.006                               | 24.2                              |
| 0.0275              | 36 x 96        | 1.179                               | 28.3                              |
| 0.0475              | 36 x 96        | 2.032                               | 48.8                              |
| 0.0535              | 36 x 96        | 2.286                               | 54.9                              |
| 0.0775              | 36 x 96        | 3.319                               | 79.7                              |

### OTHER AVAILABLE HASTELLOY ALLOYS

In addition to the items of Hastelloy alloys B, C-276, and X stocked in our warehouses and listed herein, many other items of these alloys are available from mill stock and mill production.

Also the following Hastelloy alloys are available:

|                   |                       |
|-------------------|-----------------------|
| HASTELLOY ALLOY G | HAYNES ALLOY NO. 6B   |
| HASTELLOY ALLOY N | HAYNES ALLOY NO. 6K   |
| HASTELLOY ALLOY W | HAYNES ALLOY NO. 25   |
| MULTIMET ALLOY    | HAYNES ALLOY NO. R-41 |

# HASTELLOY WELDING ELECTRODES FOR METAL ARC WELDING

| Size<br>in<br>Inches  | Length<br>in<br>Inches | Size<br>in<br>Inches | Length<br>in<br>Inches |
|-----------------------|------------------------|----------------------|------------------------|
| Hastelloy Alloy C-276 |                        | Hastelloy B-2        |                        |
| $\frac{3}{32}$ dia.   | 9                      | $\frac{3}{32}$ dia.  | 9                      |
| $\frac{1}{8}$         | 14                     | $\frac{1}{8}$        | 14                     |
| $\frac{5}{32}$        | 14                     | $\frac{5}{32}$       | 14                     |
| $\frac{3}{16}$        | 14                     | $\frac{3}{16}$       | 14                     |

## OTHER WELDING PRODUCTS

In addition to the above electrodes which are carried in our stocks, welding products including electrodes and welding wire are available on request for all Hastelloy alloys.

