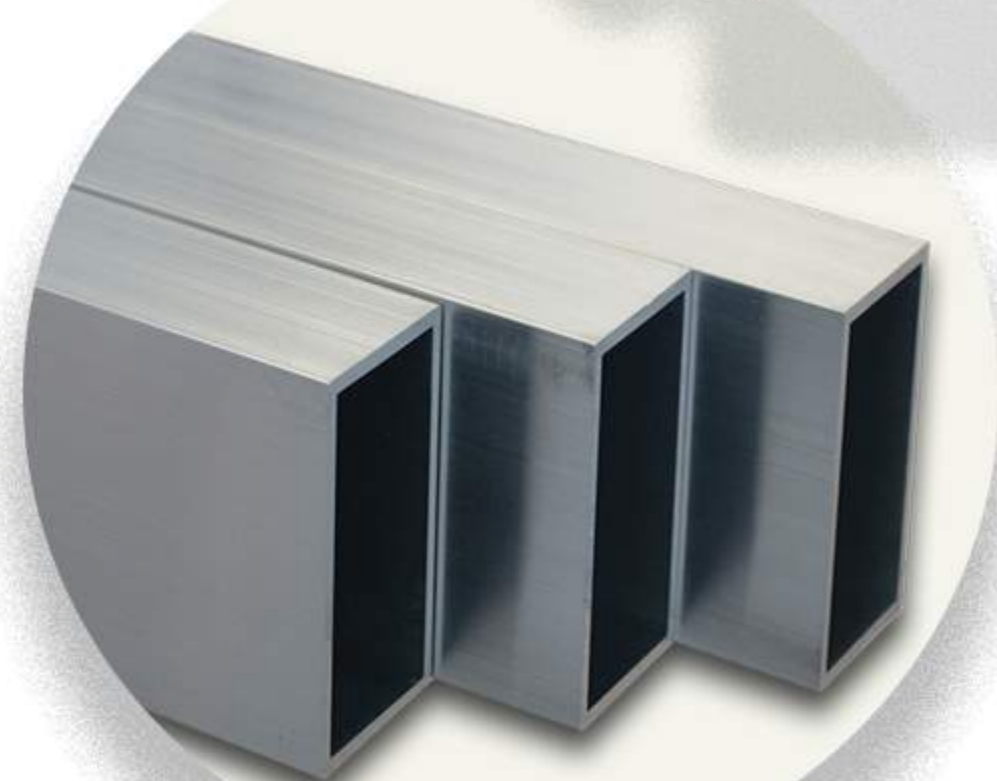
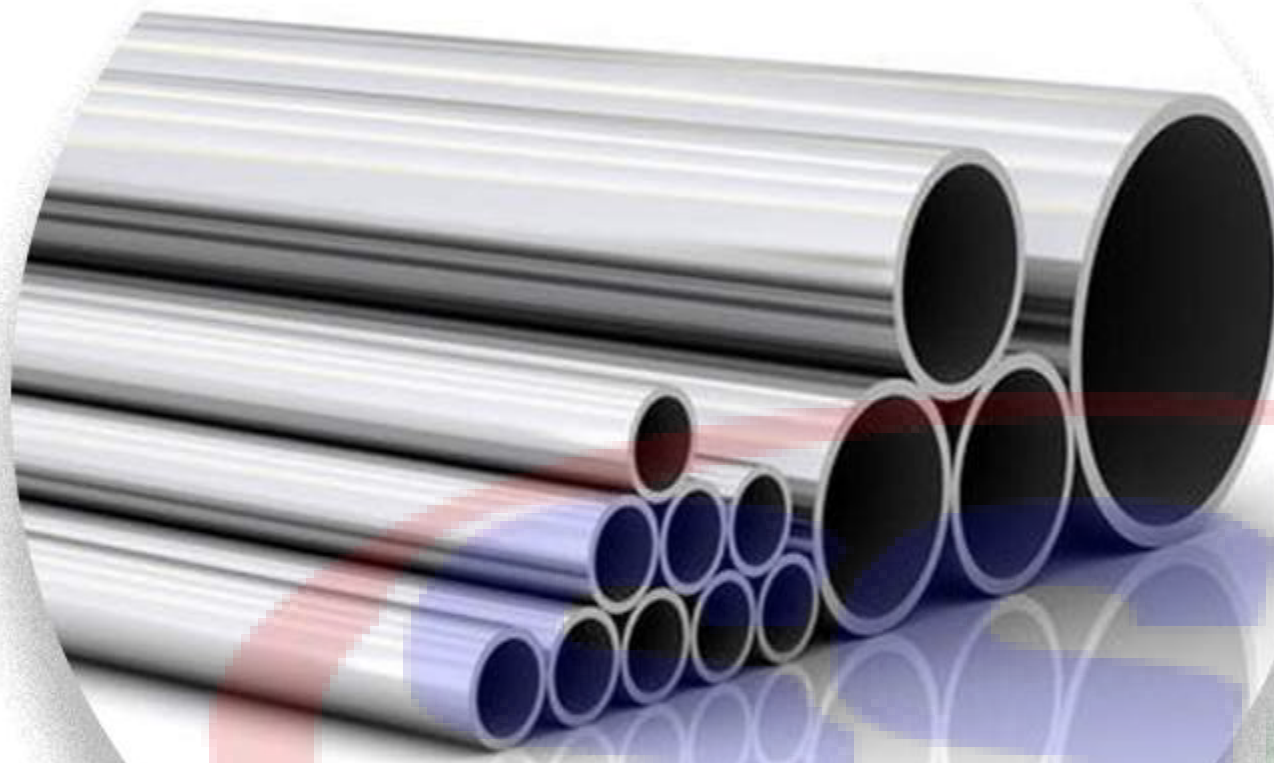


# SACHIYA STEEL INTERNATIONAL

( A HUB OF QUALITY )



**AN ISO 18001:2007, 9001:2015 TUV Certified Co. | IBR APPROVED**



**PIPES**

**AND**

**TUBES**



# Pipe





Pipe dimension in accordance to

**ANSI B 36 - 10  
NOMINAL THICKNESS AND WEIGHTS OF STAINLESS STEEL PIPES**

| Size of Pipe & Tubes |                 | Number of Schedule |       |      |       |      |        |       |        |       |        |       |        |       |        |
|----------------------|-----------------|--------------------|-------|------|-------|------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
|                      |                 | 5S                 |       | 10   |       | 10S  |        | 20    |        | 30    |        | 40    |        | 60    |        |
| Nominal in inch      | Outside in inch | mm                 | Kg/m  | mm   | Kg/m  | mm   | Kg/m   | mm    | Kg/m   | mm    | Kg/m   | mm    | Kg/m   | mm    | Kg/m   |
| 1/8"                 | 10.3            | 1.0                | 0.23  | 1.28 | 0.28  | -    | -      | 1.60  | 0.345  | -     | -      | 1.73  | 0.36   | -     | -      |
| 1/4"                 | 13.7            | 1.2                | 0.37  | 1.65 | 0.49  | -    | -      | 2.00  | 0.580  | -     | -      | 2.24  | 0.63   | -     | -      |
| 3/8"                 | 17.1            | 1.2                | 0.47  | 1.65 | 0.63  | -    | -      | 2.00  | 0.750  | -     | -      | 2.31  | 0.85   | -     | -      |
| 1/2"                 | 21.3            | 1.65               | 0.80  | 2.11 | 1.00  | -    | -      | 2.5   | 1.15   | -     | -      | 2.77  | 1.26   | -     | -      |
| 3/4"                 | 26.7            | 1.65               | 1.03  | 2.11 | 1.28  | -    | -      | 2.5   | 1.500  | -     | -      | 2.87  | 1.68   | -     | -      |
| 1"                   | 33.4            | 1.65               | 1.29  | 2.77 | 2.09  | -    | -      | 2.9   | 2.24   | -     | -      | 3.38  | 2.50   | -     | -      |
| 1 1/4"               | 42.2            | 1.65               | 1.65  | 2.77 | 2.73  | -    | -      | 3.0   | 2.910  | -     | -      | 3.56  | 3.38   | -     | -      |
| 1 1/2"               | 48.3            | 1.65               | 1.90  | 2.77 | 3.11  | -    | -      | 3.0   | 3.370  | -     | -      | 3.68  | 4.05   | -     | -      |
| 2"                   | 60.3            | 1.65               | 2.38  | 2.77 | 3.99  | -    | -      | 3.0   | 4.9    | -     | -      | 3.91  | 5.43   | -     | -      |
| 2 1/2"               | 73.0            | 2.11               | 3.70  | 3.05 | 5.26  | -    | -      | 4.00  | 6.80   | -     | -      | 5.16  | 8.62   | -     | -      |
| 3"                   | 88.9            | 2.11               | 4.50  | 3.05 | 6.45  | -    | -      | 4.00  | 8.423  | -     | -      | 5.49  | 11.47  | -     | -      |
| 3 1/2"               | 101.6           | 2.11               | 5.20  | 3.05 | 7.41  | -    | -      | 4.5   | 10.500 | -     | -      | 5.74  | 13.78  | -     | -      |
| 4"                   | 114.3           | 2.11               | 5.81  | 3.05 | 8.50  | -    | -      | 4.5   | 12.255 | -     | -      | 6.02  | 16.32  | -     | -      |
| 5"                   | 141.3           | 2.77               | 9.45  | 3.40 | 11.74 | -    | -      | 5.00  | 16.900 | -     | -      | 6.56  | 21.80  | -     | -      |
| 6"                   | 168.3           | 2.77               | 11.31 | 3.40 | 14.04 | -    | -      | 6.35  | 25.500 | -     | -      | 7.11  | 28.69  | -     | -      |
| 8"                   | 219.1           | 2.77               | 14.78 | 3.76 | 20.27 | -    | -      | 6.35  | 33.28  | 7.04  | 37.38  | 8.18  | 42.70  | 10.31 | 53.07  |
| 10"                  | 273.0           | 3.40               | 22.62 | 4.19 | 27.80 | -    | -      | 6.35  | 42.41  | 7.80  | 51.81  | 9.27  | 60.30  | 12.70 | 82.8   |
| 12"                  | 323.9           | 3.96               | 31.36 | 4.57 | 36.17 | -    | -      | 6.35  | 50.48  | 8.38  | 66.20  | 10.31 | 79.71  | 14.27 | 110.62 |
| 14"                  | 355.6           | 3.96               | 34.23 | 4.78 | 41.60 | 6.35 | 55.53  | 7.92  | 68.98  | 9.52  | 82.58  | 11.13 | 95.00  | 15.09 | 128.42 |
| 16"                  | 406.4           | 4.19               | 41.60 | 4.78 | 47.60 | 6.35 | 63.61  | 7.92  | 79.03  | 9.52  | 94.20  | 12.17 | 125.2  | 16.66 | 162.59 |
| 18"                  | 457.2           | 4.19               | 46.83 | 4.78 | 54.15 | 6.35 | 71.69  | 7.92  | 89.10  | 11.13 | 124.32 | 14.27 | 158.27 | 19.05 | 209.00 |
| 20"                  | 508.0           | 4.78               | 59.22 | 5.54 | 69.70 | 6.35 | 79.76  | 9.52  | 118.93 | 12.70 | 156.04 | 15.09 | 185.89 | 21.62 | 251.65 |
| 22"                  | 558.8           | 4.78               | 63.75 | 5.54 | 76.76 | 6.35 | 87.84  | 9.52  | 131.07 | 12.70 | 172.04 | -     | -      | 22.22 | 298.55 |
| 24"                  | 609.6           | 5.54               | 82.60 | 6.35 | 95.92 | 6.35 | 95.92  | 9.52  | 143.20 | 14.27 | 211.72 | 17.48 | 258.74 | 24.61 | 360.21 |
| 26"                  | 660.4           | -                  | -     | -    | -     | 7.92 | 129.40 | 12.70 | 205.97 | -     | -      | -     | -      | -     | -      |
| 28"                  | 711.2           | -                  | -     | -    | -     | 7.92 | 139.47 | 12.70 | 222.13 | 15.88 | 276.48 | -     | -      | -     | -      |
| 30"                  | 762.0           | -                  | -     | -    | -     | 7.92 | 148.55 | 12.70 | 238.28 | 15.88 | 296.68 | -     | -      | -     | -      |
| 32"                  | 812.8           | -                  | -     | -    | -     | 7.92 | 158.3  | 12.70 | 254.44 | 15.88 | 316.88 | 17.48 | 342.17 | -     | -      |
| 34"                  | 863.6           | -                  | -     | -    | -     | 7.92 | 168.32 | 12.70 | 270.50 | 15.88 | 336.96 | 17.48 | 364.01 | -     | -      |
| 36"                  | 914.4           | -                  | -     | -    | -     | 7.92 | 178.26 | 12.70 | 284.75 | 15.88 | 357.28 | 19.05 | 420.21 | -     | -      |

N.B. Thickness and weight "Standard" Extra-Strong and "Double Extra-Strong" within swell edges have a correspondent value in a "Schedule".

For different thickness that suitable the weights can proceed by the following formula:  $24.66 (D-t) t$

1000

\* In accordance to ANSI B 36.19



Pipe dimension in accordance to

**ANSI B 36 - 10**

**NOMINAL THICKNESS AND WEIGHTS OF STAINLESS STEEL PIPES**

| Number of Schedule |        |       |        |       |        |       |        |       |        |          |        |              |        |                     |        |
|--------------------|--------|-------|--------|-------|--------|-------|--------|-------|--------|----------|--------|--------------|--------|---------------------|--------|
| 80                 |        | 100   |        | 120   |        | 140   |        | 160   |        | Standard |        | Extra-Strong |        | Double Extra-Strong |        |
| mm                 | Kg/m   | mm    | Kg/m   | mm    | Kg/m   | mm    | Kg/m   | mm    | Kg/m   | mm       | Kg/m   | mm           | Kg/m   | mm                  | Kg/m   |
| 2.41               | 0.46   | -     | -      | -     | -      | -     | -      | -     | -      | 1.73     | 0.36   | 2.41         | 0.46   | -                   | -      |
| 3.02               | 0.80   | -     | -      | -     | -      | -     | -      | -     | -      | 2.24     | 0.63   | 3.02         | 0.80   | -                   | -      |
| 3.20               | 1.10   | -     | -      | -     | -      | -     | -      | -     | -      | 2.31     | 0.85   | 3.20         | 1.10   | -                   | -      |
| 3.73               | 1.62   | -     | -      | -     | -      | -     | -      | 4.78  | 1.97   | 2.77     | 1.26   | 3.73         | 1.62   | 7.47                | 2.54   |
| 3.91               | 2.21   | -     | -      | -     | -      | -     | -      | 5.56  | 2.93   | 2.87     | 1.68   | 3.91         | 2.19   | 7.82                | 3.63   |
| 4.55               | 3.23   | -     | -      | -     | -      | -     | -      | 6.35  | 4.30   | 3.38     | 2.50   | 4.55         | 3.23   | 9.09                | 5.45   |
| 4.85               | 4.50   | -     | -      | -     | -      | -     | -      | 6.35  | 5.69   | 3.56     | 3.38   | 4.85         | 4.46   | 9.70                | 7.75   |
| 5.08               | 5.49   | -     | -      | -     | -      | -     | -      | 7.14  | 7.35   | 3.68     | 4.05   | 5.08         | 5.40   | 10.16               | 9.54   |
| 5.54               | 7.60   | -     | -      | -     | -      | -     | -      | 8.74  | 11.26  | 3.91     | 5.43   | 5.54         | 7.47   | 11.07               | 13.44  |
| 7.01               | 11.59  | -     | -      | -     | -      | -     | -      | 9.52  | 15.15  | 5.16     | 8.62   | 7.01         | 11.40  | 14.02               | 20.39  |
| 7.62               | 15.25  | -     | -      | -     | -      | -     | -      | 11.13 | 21.67  | 5.49     | 11.28  | 7.62         | 15.25  | 15.24               | 28.11  |
| 8.08               | 18.62  | -     | -      | -     | -      | -     | -      | -     | -      | 5.74     | 13.56  | 8.08         | 18.62  | -                   | -      |
| 8.56               | 22.29  | -     | -      | 11.13 | 28.25  | -     | -      | 13.49 | 34.05  | 6.02     | 16.06  | 8.56         | 22.29  | 17.12               | 41.66  |
| 9.52               | 30.92  | -     | -      | 12.70 | 40.24  | -     | -      | 15.88 | 49.87  | 6.55     | 21.76  | 9.52         | 30.92  | 19.05               | 58.31  |
| 10.97              | 43.21  | -     | -      | 14.27 | 54.20  | -     | -      | 18.26 | 68.53  | 7.11     | 28.23  | 10.97        | 42.52  | 21.95               | 79.11  |
| 12.70              | 65.63  | 15.08 | 76.93  | 18.26 | 90.32  | 20.62 | 102.47 | 23.01 | 112.97 | 8.18     | 42.49  | 12.70        | 64.57  | 22.22               | 107.78 |
| 15.09              | 97.27  | 18.26 | 116.38 | 21.44 | 134.90 | 25.40 | 157.51 | 28.58 | 174.95 | 9.27     | 60.24  | 15.09        | 97.27  | 25.40               | 155.5  |
| 17.48              | 133.88 | 21.44 | 162.14 | 25.40 | 189.82 | 28.58 | 211.31 | 33.32 | 242.40 | 9.52     | 73.76  | 17.48        | 133.88 | 25.40               | 189.92 |
| 19.05              | 159.00 | 23.83 | 197.74 | 27.79 | 227.88 | 31.75 | 257.47 | 35.71 | 286.04 | 9.52     | 81.21  | 19.05        | 159.00 | -                   | -      |
| 21.44              | 203.50 | 26.19 | 249.34 | 30.96 | 290.68 | 36.53 | 338.32 | 40.49 | 370.74 | 9.52     | 93.13  | 21.44        | 203.50 | -                   | -      |
| 23.83              | 258.29 | 29.36 | 314.54 | 34.92 | 369.34 | 39.67 | 414.74 | 45.24 | 466.67 | 9.52     | 105.05 | 23.83        | 258.29 | -                   | -      |
| 26.19              | 315.97 | 32.54 | 387.41 | 38.10 | 448.3  | 44.45 | 515.94 | 50.01 | 573.31 | 9.52     | 116.97 | 26.19        | 315.97 | -                   | -      |
| 28.58              | 379.70 | 34.92 | 457.83 | 41.28 | 535.17 | 47.62 | 609.30 | 53.98 | 682.57 | 9.52     | 128.89 | 28.58        | 379.70 | -                   | -      |
| 30.96              | 448.3  | 38.89 | 555.76 | 46.02 | 649.44 | 52.37 | 730.72 | 59.54 | 819.70 | 9.52     | 140.81 | 30.96        | 448.3  | -                   | -      |
| -                  | -      | -     | -      | -     | -      | -     | -      | -     | -      | 9.52     | 152.73 | 12.70        | 202.65 | -                   | -      |
| -                  | -      | -     | -      | -     | -      | -     | -      | -     | -      | 9.52     | 164.65 | 12.70        | 234.44 | -                   | -      |
| -                  | -      | -     | -      | -     | -      | -     | -      | -     | -      | 9.52     | 176.57 | 12.70        | 234.44 | -                   | -      |
| -                  | -      | -     | -      | -     | -      | -     | -      | -     | -      | 9.52     | 188.50 | 12.70        | 250.33 | -                   | -      |
| -                  | -      | -     | -      | -     | -      | -     | -      | -     | -      | 9.52     | 200.42 | 12.70        | 266.22 | -                   | -      |
| -                  | -      | -     | -      | -     | -      | -     | -      | -     | -      | 9.52     | 212.34 | 12.70        | 282.12 | -                   | -      |

N.B. Thickness and weight "Standard" Extra-Strong and "Double Extra-Strong" within swell edges have a correspondent value in a "Schedule".

For different thickness that suitable the weights can proceed by the following formular  $\frac{24.66 (D-t)}{1000}$

\* In accordance to ANSI B 36.19



### HIGHLIGHTS OF ASTM SPECIFICATION STAINLESS STEEL TUBES AND PIPES

| Specification  | Allowable Outside Diameter Variation in mm  |  |  | Allowable wall Thickness Variation                          |  | Exact Length Tolerances in mm                      |                            | Testing   |
|--|---|--|--|---|--|--|----------------------------|---|
| Specification  | Diameter  | Over   | Under  | Over %  | Under%   | Over   | Under                      | Testing   |
| ASTM A -213<br>Seamless Boiler,<br>Superheater and<br>Heat Exchanger<br>Tubes              | Upto 25.4<br>25.4 - 38.1 incl.<br>38.1 - 50.8 excl.<br>50.8 - 63.5 incl.<br>63.5 - 76.2 excl.<br>76.2 - 101.6 incl. | 0.1016<br>0.1524<br>0.2032<br>0.2540<br>0.3048<br>0.3810 | 0.1016<br>0.1524<br>0.2032<br>0.2540<br>0.3048<br>0.3810 | +20<br>+20<br>+22<br>+22<br>+22<br>+22                      | -0<br>-0<br>-0<br>-0<br>-0<br>-0                   | 3.175<br>3.175<br>3.176<br>3.760<br>4.760<br>4.760 | 0<br>0<br>0<br>0<br>0<br>0 | Tension Test<br>Flattening Test<br>Hardness test<br>100% Hydrostatic Test<br>Flare Test<br>Refer to ASTM A-450  |
| ASTM A - 249<br>Welded Boiler,<br>Superheater,<br>Heat<br>Exchanger and<br>Condenser Tubes | Under 25.4<br>25.4 -38.1 incl.<br>38.1 - 50.8 excl.<br>50.8 - 63.5 excl.<br>63.5 - 76.2 excl.<br>76.2 - 101.6 incl. | 0.1016<br>0.1524<br>0.2032<br>0.2540<br>0.3048<br>0.3810 | 0.1016<br>0.1524<br>0.2032<br>0.2540<br>0.3048<br>0.3810 | +10<br>+10<br>+10<br>+10<br>+10<br>+10                      | -10<br>-10<br>-10<br>-10<br>-10<br>-10             | 3.175<br>3.175<br>3.175<br>3.76<br>4.76<br>4.76    | 0<br>0<br>0<br>0<br>0<br>0 | Tension Test,<br>Flattening test<br>Flare Test<br>* Reverse Bend Test<br>Hardness Test<br>100% Hydrostatic Test<br>*Reverse Flattening Test<br>Refer to ASTM A-450<br>Whenever applicable |
| ASTM A -269<br>Seamless &<br>Welded Service  | Upto 12.7<br>12.7 -38.1 excl.<br>38.1 - 88.9 excl.<br>88.9 - 139.7 excl.<br>139.7 - 203.2 excl.                     | 0.13<br>0.13<br>0.25<br>0.38<br>0.76                     | 0.13<br>0.13<br>0.25<br>0.38<br>0.76                     | +15<br>+10<br>+10<br>+10<br>+10                             | -15<br>-10<br>-10<br>-10<br>-10                    | 3.2<br>3.2<br>4.8<br>4.8<br>4.8                    | 0<br>0<br>0<br>0<br>0      | Tension Test<br>Flange Test<br>(Welded only)<br>Hardness Test<br>Reverse Flattening test<br>(Welded only)<br>100% Hydrostatic Test<br>Refer to ASTM A-269                                 |
| ASTM A -312<br>Seamless &<br>Welded Pipes  | 13.7 - 48.3 incl.<br>48.3 - 114.3 incl.<br>114.3 - 220 incl.  | 0.40<br>0.79<br>1.59                                     | 0.79<br>0.79<br>0.79                                     | Minimum Wall tubes<br>12.5% under nominal<br>wall Specified |  | 6.4<br>6.4<br>6.4                                  | 0<br>0<br>0                | Tension Test<br>Flattening Test<br>100% Hydrostatic Test<br>(Normally Random lengths ordered)   |
| ASTM - 270<br>Seamless & Welded<br>Sanitary Tubes  | 25.4<br>38.1<br>50.8<br>63.5<br>76.2<br>101.6   | .05<br>.05<br>.05<br>.05<br>.08<br>.08                   | .20<br>.20<br>.28<br>.28<br>.30<br>.38                   | +12.5<br>+12.5<br>+12.5<br>+12.5<br>+12.5<br>+12.5          | -12.5<br>-12.5<br>-12.5<br>-12.5<br>-12.5<br>-12.5 | 3.2<br>3.2<br>3.2<br>3.2<br>3.2<br>3.2             | 0<br>0<br>0<br>0<br>0<br>0 | Reverse Flattening test<br>100% Hydrostatic test<br>External polish on all<br>tubes<br>Refer to ASTM A-270  |
| ASTM A - 268<br>Seamless &<br>Welded<br>Femic Stainless<br>Steel tubes                     | Upto 12.7<br>12.7 - 38.1 excl.<br>38.1 - 88.9 excl.<br>88.9 - 168.9 excl.   | 0.13<br>0.13<br>0.25<br>0.38                             | 0.13<br>0.13<br>0.25<br>0.38                             | +15<br>+10<br>+10<br>+10                                    | -15<br>-10<br>-10<br>-10                           | 3.2<br>3.2<br>4.8<br>4.8                           | 0<br>0<br>0<br>0           | Tension Test<br>Flange Test CERW only<br>Hardness Test<br>Reverse Flattening Test<br>100% Hydrostate Test   |
| ASTM A -358<br>For Welded big<br>Diameter Pipes  | For all size  | +0.5%  | 0.5%   | No<br>Limit   | -0.3<br>mm   | Customer's<br>Specification                        |                            |   |



## SUMMARY OF THE MAIN ASTM STANDARDS GENERALLY USED FOR PIPING

| ASTM | Grade   | Chemical requirement percent (%) |           |       |       |           |           |           |           |           |        |                          | Mechanical requirements |   |                    |           |  |
|------|---------|----------------------------------|-----------|-------|-------|-----------|-----------|-----------|-----------|-----------|--------|--------------------------|-------------------------|---|--------------------|-----------|--|
|      |         | C Max                            | MN max    | P max | S max | Si max    | Ni        | Cr        | Mo        | Cu        | Others | Tensile Strength min-Mpa | Yield Strength min-MPa  | Elong. min %  | Impact test at C F |           |  |
| A53  | A       | 0.25                             | 0.95      | 0.05  | 0.06  |           | 0.40max   | 0.40max   | 0.15max   | 0.40max   |        |                          |                         | 330   | 205                | 36        | Impact test at C F   |
|      | B       | 0.30                             | 1.20      | 0.05  | 0.06  |           | 0.40max   | 0.40max   | 0.15max   | 0.40max   |        |                          |                         | 415   | 240                | 29.5      |  |
| A106 | A       | 0.25                             | 0.27-0.93 | 0.035 | 0.035 | 0.10min   | 0.40max   | 0.40max   | 0.15max   | 0.40max   |        |                          |                         | 330   | 205                | L35-T25   |  |
|      | B       | 0.30                             | 0.29-1.06 | 0.035 | 0.035 | 0.10min   | 0.40max   | 0.40max   | 0.15max   | 0.40max   |        |                          |                         | 240   | 240                | L30-T16.5 |  |
|      | C       | 0.35                             | 0.29-1.06 | 0.035 | 0.035 | 0.10min   | 0.40max   | 0.40max   | 0.15max   | 0.40max   |        |                          |                         | 485   | 275                | L30-T16.5 |  |
| A312 | TP 304  | 0.08                             | 2.00      | 0.040 | 0.030 | 0.75      | 8.00-11.0 | 16.0-20.0 |           |           |        |                          |                         | 515   | 205                | L35-T25   |  |
|      | TP 304L | 0.035                            | 2.00      | 0.040 | 0.030 | 0.75      | 8.00-13.0 | 18.0-20.0 |           |           |        |                          |                         | 485   | 170                | L35-T25   |  |
|      | TP 310S | 0.08                             | 2.00      | 0.045 | 0.030 | 0.75      | 19.0-22.0 | 24.0-26.0 | 0.75 max  |           |        |                          |                         | 515   | 205                | L35-T25   |  |
|      | TP 316  | 0.035                            | 2.00      | 0.040 | 0.030 | 0.75      | 11.0-14.0 | 16.0-18.0 | 2.00-3.00 |           |        |                          |                         | 515   | 205                | L35-T25   |  |
|      | TP316L  | 0.035                            | 2.00      | 0.040 | 0.030 | 0.75      | 11.0-15.0 | 16.0-18.0 | 2.00-3.00 |           |        |                          |                         | 485   | 170                | L35-T25   |  |
|      | TP317L  | 0.035                            | 2.00      | 0.040 | 0.030 | 0.75      | 11.0-15.0 | 18.0-20.0 | 3.00-4.00 |           |        |                          |                         | 515   | 205                | L35-T25   |  |
|      | TP 321  | 0.08                             | 2.00      | 0.040 | 0.030 | 0.75      | 9.00-13.0 | 17.0-20.0 |           |           |        |                          |                         | 515   | 205                | L35-T25   |  |
|      | TP 347  | 0.08                             | 2.00      | 0.040 | 0.030 | 0.75      | 9.00-13.0 | 17.0-20.0 |           |           |        |                          |                         | 515   | 205                | L35-T25   |  |
|      |         |                                  |           |       |       |           |           |           |           |           |        |                          |                         |   |                    |           |  |
| A333 | 3       | 0.19                             | 0.31-0.64 | 0.025 | 0.025 | 0.18-0.37 | 3.18-3.82 |           |           |           |        |                          |                         | 450   | 240                | L30-T20   | -100, -160<br>-100, -160<br>-45, -50<br>-75, -100<br>-195, -320<br>-75, -100 |
|      | 4       | 0.12                             | 0.50-1.05 | 0.025 | 0.025 | 0.08-0.37 | 0.47-0.96 | 0.44-1.01 |           | 0.40-0.75 |        |                          |                         | 415   | 240                | L30-T16.5 |  |
|      | 6       | 0.30                             | 0.29-1.06 | 0.025 | 0.025 | 0.10 min  |           |           |           |           |        |                          |                         | 415   | 240                | L30-T16.5 |  |
|      | 7       | 0.19                             | 0.90      | 0.025 | 0.025 | 0.13-0.32 | 2.08-2.57 |           |           |           |        |                          |                         | 450   | 240                | L30-T22   |  |
|      | 8       | 0.13                             | 0.90      | 0.025 | 0.025 | 0.13-0.32 | 8.40-9.60 |           |           |           |        |                          |                         | 690   | 515                | L22       |  |
|      | 9       | 0.20                             | 0.40-1.06 | 0.025 | 0.025 |           | 1.60-2.24 |           |           | 0.75-1.25 |        |                          |                         | 435   | 315                | L28       |  |
|      | P1      | 0.10-0.20                        | 0.30-0.60 | 0.025 | 0.025 | 0.10-0.05 |           |           | 0.44-0.65 |           |        |                          |                         | 380   | 205                | L30-T20   |  |
|      | P2      | 0.10-0.20                        | 0.30-0.61 | 0.025 | 0.025 | 0.10-0.30 |           | 0.60-0.81 | 0.44-0.65 |           |        |                          |                         | 380   | 205                | L30-T20   |  |
| A335 | P5      | 0.15                             | 0.30-0.60 | 0.025 | 0.025 | 0.50      |           | 4.00-6.00 | 0.60-0.65 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P9      | 0.15                             | 0.30-0.60 | 0.025 | 0.025 | 0.50      |           | 8.00-10.0 | 0.60-0.65 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P11     | 0.05-0.15                        | 0.30-0.61 | 0.025 | 0.025 | 0.50-1.00 |           | 1.00-1.00 | 0.64-0.65 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P12     | 0.05-0.15                        | 0.30-0.61 | 0.025 | 0.025 | 0.50      |           | 0.80-1.25 | 0.44-0.65 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P15     | 0.05-0.15                        | 0.30-0.60 | 0.025 | 0.025 | 1.15-1.65 |           |           | 0.44-0.65 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P21     | 0.05-0.15                        | 0.30-0.60 | 0.025 | 0.025 | 0.50      |           | 2.65-3.35 | 0.60-1.06 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P22     | 0.05-0.15                        | 0.30-0.60 | 0.025 | 0.025 | 0.50      |           | 1.90-2.60 | 0.67-1.13 |           |        |                          |                         | 415   | 205                | L30-T20   |  |
|      | P31     | 0.08-0.12                        | 0.30-0.60 | 0.025 | 0.025 | 0.20-0.50 | 0.40max   | 8.00-9.50 | 0.65-1.05 |           |        |                          |                         | 585   | 415                | L20       |  |
|      | P32     | 0.08-0.12                        | 0.30-0.60 | 0.025 | 0.025 | 0.20-0.50 | 0.40max   | 8.00-9.50 | 0.65-1.05 |           |        |                          |                         | 585   | 415                | L20       |  |
| A358 | TP304   | 0.08                             | 2.00      | 0.045 | 0.030 | 0.75      | 8.0-10.50 | 16.0-20.0 |           |           |        |                          |                         | Class 1 : Double welded pipes & full Radiography                              |                    |           |  |
|      | TP310   | 0.08                             | 2.00      | 0.045 | 0.030 | 0.50      | 19.0-22.0 | 24.0-26.0 |           |           |        |                          |                         | Class 2 : Double welded no Radiography  |                    |           |  |
|      | TP316   | 0.08                             | 2.00      | 0.045 | 0.030 | 0.75      | 10.0-14.0 | 16.0-18.0 | 2.0-3.0   |           |        |                          |                         | Class 3 : Single welded no Radiography  |                    |           |  |
|      | TP316L  | 0.030                            | 2.00      | 0.045 | 0.030 | 0.75      | 10.0-14.0 | 16.0-18.0 | 2.0-3.0   |           |        |                          |                         | Class 4 : Single welded full Radiography root pass without addition of filler |                    |           |  |
|      | TP317L  | 0.030                            | 2.00      | 0.045 | 0.030 | 0.75      | 11.0-15.0 | 18.0-20.0 | 3.0-4.0   |           |        |                          |                         | Class 5 : Double Welded spot Radiography                                      |                    |           |  |
|      | TP321   | 0.08                             | 2.00      | 0.045 | 0.030 | 0.75      | 9.0-12.0  | 17.0-19.0 |           |           |        |                          |                         |   |                    |           |  |
|      | TP 347  | 0.08                             | 2.00      | 0.045 | 0.030 | 0.75      | 9.0-13.0  | 17.0-19.0 |           |           |        |                          |                         |   |                    |           |  |

Formula - Sheet Width Required for Rolled & Welded Pipes - O. D. (mm) - Thickness (mm) x 3.14 = Sheet Width.  
 L-Longitudinal  
 T- Transverse



**PHYSICAL & CHEMICAL PROPERTIES OF STAINLESS STEEL, ALLOY STEEL & CARBON STEEL BARS**

| <b>ASTM A479 STAINLESS STEEL ROUND BAR CHEMICAL &amp; PHYSICAL PROPERTIES</b> |           |          |          |           |           |          |          |     |                      |                  |                |                        |        |                   |
|---|-----------|----------|----------|-----------|-----------|----------|----------|-----|----------------------|------------------|----------------|------------------------|--------|-------------------|
| ASTM GRADE  | C         | Mn       | Si       | S         | P         | Cr       | Ni       | Mo  | Other                | Tensile Psi(MPa) | Yield Psi(MPa) | Elongation Strip/Round | Hardn. | Redu.in Area. (%) |
| A479 TP-304   | 0.08 max  | 2.00 max | 1.00 max | 0.030 max | 0.045 max | 18.0 max | 8.0 max  | —   | —                    | 75000 (515)      | 30000 (205)    | 30                     | —      | 40                |
| A479 TP-316   | 0.08 max  | 2.00 max | 1.00 max | 0.030 max | 0.045 max | 16.0 max | 10.5 max | 2.0 | —                    | 75000 (515)      | 30000 (205)    | 30                     | —      | 40                |
| A479 TP-317L  | 0.035 max | 2.00 max | 1.00 max | 0.030 max | 0.045 max | 18.0 max | 14.0 max | 3.0 | —                    | 75000 (515)      | 30000 (205)    | 30                     | —      | 40                |
| A479 TP-310   | 0.08 max  | 2.00 max | 1.00 max | 0.030 max | 0.045 max | 20.0 max | 15.0 max | 4.0 | —                    | 75000 (515)      | 30000 (205)    | 30                     | —      | 40                |
| A479 TP-347H  | 0.04 max  | 2.00 max | 1.00 max | 0.030 max | 0.040 max | 26.0 max | 22.0 max | —   | Cb-BxC<br>-13.0      | 75000 (515)      | 30000 (205)    | 30                     | —      | 40                |
| 479 TP-321  | 0.10 max  | 2.00 max | 1.00 max | 0.030 max | 0.045 max | 19.0 max | 13.0 max | 9.0 | 5(C+N)+Ti<br>-<0.70% | 75000 (515)      | 30000 (205)    | 30                     | —      | 40                |

| <b>ASTM A182 ALLOY STEEL ROUND BAR CHEMICAL &amp; PHYSICAL PROPERTIES</b> |          |          |          |          |          |         |         |          |       |                  |                |                        |               |                   |
|---|----------|----------|----------|----------|----------|---------|---------|----------|-------|------------------|----------------|------------------------|---------------|-------------------|
| ASTM GRADE  | C        | Mn       | Si       | S        | P        | Cr      | Ni      | Mo       | Other | Tensile Psi(MPa) | Yield Psi(MPa) | Elongation Strip/Round | Hardn.        | Redu.in Area. (%) |
| 182 F 11 Class 2  | 0.10 max | 0.30 max | 0.50 max | 0.04 max | 0.04 max | 1.0 max | —       | 0.44 max | —     | 70000 (45.46)    | 40000 (27.05)  | 20                     | 143-207       | 30                |
| A 182 F22 Class 3   | 0.05 max | 0.30 max | 0.50 max | 0.04 max | 0.04 max | 2.0 max | —       | 0.65 max | —     | 75000 (52.52)    | 45000 (31.7)   | 20                     | 156-207       | 30                |
| A 182 F 5   | 0.15 max | 0.30 max | 0.50 max | 0.03 max | 0.03 max | 4.0 max | 0.5 max | 0.44 max | —     | 70000 (48.45)    | 40000 (27.05)  | 20                     | 143-217       | 35                |
| A 182 F 9   | 0.15 max | 0.30 max | 0.50 max | 0.03 max | 0.03 max | 8.0 max | —       | 0.65 max | —     | 85 (56.65)       | 55 (380)       | 20                     | 179-217 (BHN) | 40                |

| <b>IS-1875 ASTM A105 CARBON STEEL ROUND BAR CHEMICAL &amp; PHYSICAL PROPERTIES</b> |          |          |           |           |           |          |          |          |  |                  |                |                        |                |                   |
|--|----------|----------|-----------|-----------|-----------|----------|----------|----------|--|------------------|----------------|------------------------|----------------|-------------------|
| ASTM GRADE   | C        | Mn       | Si        | S         | P         | Cr       | Ni       | Mo       | Other                                  | Tensile Psi(MPa) | Yield Psi(MPa) | Elongation Strip/Round | Hardn.         | Redu.in Area. (%) |
| A 105  | 0.35 max | 0.60 max | 0.100 max | 0.040 max | 0.035 max | —        | —        | —        | —                                      | 70000 (485)      | 36000 (250)    | 30-Strip<br>22-Round   | 187 max        | 30 Round          |
| A1F2   | 0.30 max | 1.35 max | 0.15 max  | 0.040 max | 0.035 max | 0.30 max | 0.40 max | 0.12 max | Cu-0.4 max<br>Cb-0.02 max<br>Va-0.3max | 70-95 (485-655)  | 36 (250)       | 20/16<br>22/30         | 20/16 (-45.6°) | 36                |

Formula - Weight of stainless steel rounds = Dia. (mm) x Dia. (mm) x Dia. (mm) x 0.00623 = Kg Per Mtr.  
 Weight of Stainless Steel Hexagonal Rods = Dia. (mm) x Dia. (mm) x Dia. (mm) x 0.00679 = Kg Per Mtr.  
 Weight of Stainless Steel Square Bars = Dia. (mm) x Dia. (mm) x Dia. (mm) x 0.00787 = Kg Per Mtr.  
 Weight of Stainless Steel Circle & Blanks = O.D. (mm) x O.D. (mm) X Thk. (mm)/160/1000 = Kg Per Pcs.



## STANDARD TYPES OF STAINLESS STEEL GAUGE PIPE & BARS

| WEIGHT & THICKNESS OF S.S. GAUGE PIPE PER FEET |       |               |               |               |               |               |
|--|-------|---------------|---------------|---------------|---------------|---------------|
| Size   | O.D.  | 10G<br>(3.25) | 12G<br>(2.64) | 14G<br>(2.03) | 16G<br>(1.62) | 18G<br>(1.21) |
| 1/4"   | 6.35  | 0.075         | 0.070         | 0.065         | 0.058         | 0.046         |
| 5/16"  | 7.93  | 0.114         | 0.105         | 0.089         | 0.079         | 0.060         |
| 3/8"   | 9.52  | 0.152         | 0.135         | 0.113         | 0.097         | 0.080         |
| 1/2"   | 12.70 | 0.226         | 0.200         | 0.157         | 0.134         | 0.105         |
| 3/4"   | 19.05 | 0.386         | 0.326         | 0.256         | 0.215         | 0.161         |
| 1"   | 25.40 | 0.541         | 0.450         | 0.351         | 0.294         | 0.218         |
| 1 1/4"   | 31.82 | 0.696         | 0.580         | 0.448         | 0.375         | 0.275         |
| 1 1/2"   | 38.10 | 0.851         | 0.700         | 0.542         | 0.542         | 0.322         |
| 1 3/4"   | 44.45 | 1.020         | 0.832         | 0.646         | 0.530         | 0.390         |
| 2"   | 50.8  | 1.161         | 0.960         | 1.733         | 0.607         | 0.447         |
| 2 1/4"   | 57.15 | 1.315         | 1.085         | 0.828         | 0.697         | 0.504         |
| 2 1/2"   | 63.5  | 1.472         | 1.210         | 0.924         | 0.792         | 0.562         |
| 2 3/4"   | 69.85 | 1.630         | 1.338         | 1.022         | 0.847         | 0.619         |
| 3"   | 76.2  | 1.782         | 1.460         | 1.115         | 0.924         | 0.676         |
| 3 1/2"   | 88.9  | 2.092         | 1.718         | 1.306         | 1.082         | 0.791         |
| 4"   | 101.6 | 2.403         | 1.971         | 1.497         | 1.239         | 0.905         |
| 4 1/2"   | 114.3 | 2.713         | 2.224         | 1.688         | 1.397         | 1.020         |
| 5"   | 127.0 | 3.023         | 2.477         | 1.879         | 1.554         | 1.134         |
| 5 1/2"   | 139.7 | 3.336         | 2.730         | 2.070         | 1.713         | 1.250         |
| 6"   | 152.4 | 3.654         | 2.983         | 2.291         | 1.875         | 1.364         |
| 6 1/2"   | 165.1 | 3.975         | 3.256         | 2.452         | 2.028         | 1.478         |

Note - Weight for \*\*\* size bar available on bar will go to 34 and upto 150

| STANDARD WIRE GAUGE |      |         |     |       |        |
|---------------------|------|---------|-----|-------|--------|
| SEG                 | Dia  | Dia     | SWG | Dia   | Dia    |
| No.                 | Inch | MM      | No. | Inch  | MM     |
| 7/0                 | .500 | 12.7000 | 23  | .024  | 0.6096 |
| 6/0                 | .464 | 11.7856 | 24  | .022  | 0.5588 |
| 5/0                 | .432 | 10.9728 | 25  | .020  | 0.5080 |
| 4/0                 | .400 | 10.1600 | 26  | .018  | 0.4572 |
| 3/0                 | .372 | 9.4488  | 27  | .016  | 0.4166 |
| 2/0                 | .348 | 8.8892  | 28  | .0148 | 0.3759 |
| 1/0                 | .324 | 8.2296  | 29  | .0136 | 0.3454 |
| 1                   | .300 | 7.6200  | 30  | .0214 | 0.3150 |
| 2                   | .276 | 7.0104  | 31  | .0116 | 0.2946 |
| 3                   | .252 | 6.4008  | 32  | 0.108 | 0.2743 |
| 4                   | .232 | 5.8928  | 33  | .0100 | 0.2540 |
| 5                   | .212 | 5.3848  | 34  | .0092 | 0.2337 |
| 6                   | .192 | 4.8766  | 35  | .0084 | 0.2134 |
| 7                   | .176 | 4.4704  | 36  | .0076 | 0.1930 |
| 8                   | .160 | 4.0640  | 37  | .0068 | 0.1727 |
| 9                   | .144 | 3.6576  | 38  | .0060 | 0.1524 |
| 10                  | .128 | 3.2512  | 39  | .0052 | 0.1321 |
| 11                  | .116 | 2.9464  | 40  | .0048 | 0.1219 |
| 12                  | .104 | 2.6416  | 41  | .0044 | 0.1118 |
| 13                  | .092 | 2.3368  | 42  | .0040 | 0.1016 |
| 14                  | .080 | 2.0320  | 43  | .0036 | 0.0914 |
| 15                  | .072 | 1.8288  | 44  | .0032 | 0.0813 |
| 16                  | .064 | 1.6256  | 45  | .0028 | 0.0711 |
| 17                  | .056 | 1.4224  | 46  | .0024 | 0.0610 |
| 18                  | .048 | 1.2192  | 47  | .0020 | 0.0580 |
| 19                  | .040 | 1.0160  | 48  | .0016 | 0.0406 |
| 20                  | .036 | 0.9144  | 49  | .0012 | 0.0305 |
| 21                  | .032 | 0.8128  | 50  | .0010 | 0.0254 |
| 22                  | .028 | 0.7112  |     |       |        |





### MILD STEEL PIPES CONFIRMING TO IS : 1239 (PART 1) - 1979

| Nominal Bore |        | Outside Diameter |        | Light     |        | Medium    |         | Heavy     |         |
|--------------|--------|------------------|--------|-----------|--------|-----------|---------|-----------|---------|
|              |        |                  |        | Thickness | Weight | Thickness | Weight  | Thickness | Weight  |
| Inch         | In mm  | In               | mm     | mm        | kg/mtr | mm        | Kg/Mtr. | mm        | Kg/Mtr. |
| 1/8"         | 3 mm   | 0.406            | 10.32  | 1.80      | 0.361  | 2.00      | 0.407   | 2.65      | 0.493   |
| 1/4"         | 6 mm   | 0.532            | 13.49  | 1.80      | 0.517  | 2.35      | 0.650   | 2.90      | 0.769   |
| 3/8"         | 10 mm  | 0.872            | 17.10  | 1.80      | 0.674  | 2.35      | 0.852   | 2.90      | 1.02    |
| 1/2"         | 15 mm  | 0.844            | 21.43  | 2.00      | 0.952  | 2.65      | 1.122   | 3.25      | 1.45    |
| 3/4"         | 20 mm  | 1.094            | 27.20  | 2.35      | 1.410  | 2.65      | 1.580   | 3.25      | 1.90    |
| 1"           | 25 mm  | 1.312            | 33.80  | 2.65      | 2.010  | 3.25      | 2.440   | 4.05      | 2.97    |
| 1 1/4"       | 32 mm  | 1.656            | 42.90  | 2.65      | 2.580  | 3.25      | 3.140   | 4.05      | 3.84    |
| 1 1/2"       | 40 mm  | 1.906            | 48.40  | 2.90      | 3.250  | 3.25      | 3.610   | 4.05      | 4.43    |
| 2"           | 50 mm  | 2.375            | 60.30  | 2.90      | 4.110  | 3.65      | 5.100   | 4.47      | 6.17    |
| 2 1/2"       | 65 mm  | 3.004            | 76.20  | 3.25      | 5.840  | 3.65      | 6.610   | 4.47      | 7.90    |
| 3"           | 80 mm  | 3.500            | 88.90  | 3.25      | 6.810  | 4.05      | 8.470   | 4.85      | 10.1    |
| 4"           | 100 mm | 4.500            | 114.30 | 3.65      | 9.890  | 4.50      | 12.10   | 5.40      | 14.4    |
| 5"           | 125 mm | 5.500            | 139.70 | -         | -      | 4.85      | 16.20   | 5.40      | 17.8    |
| 6"           | 150 mm | 6.500            | 165.10 | -         | -      | 4.85      | 19.20   | 5.40      | 21.2    |

### BIG DIAMETER ERW PIPES CONFIRMING TO IS 3589

| Wall Thickness in mm | Nominal Bore 7" NB<br>193.7 mm OD | Nominal Bore 8" NB<br>219.1 mm OD | Nominal Bore 10" NB<br>273 mm OD | Nominal Bore 12" NB<br>323.7 mm OD | Nominal Bore 14" NB<br>355.6 mm OD | Nominal Bore 16" NB<br>406.4 mm OD | Nominal Bore 18" NB<br>457 mm OD | Nominal Bore 20" NB<br>508 mm OD |
|----------------------|-----------------------------------|-----------------------------------|----------------------------------|------------------------------------|------------------------------------|------------------------------------|----------------------------------|----------------------------------|
| kg/mtr               | kg/mtr                            | kg/mtr                            | kg/mtr                           | kg/mtr                             | kg/mtr                             | kg/mtr                             | kg/mtr                           | kg/mtr                           |
| 4.85                 | 22.59                             | 25.62                             | 32.07                            | 38.13                              | -                                  | -                                  | -                                | -                                |
| 5.20                 | 24.17                             | 27.43                             | 34.34                            | 40.85                              | -                                  | -                                  | -                                | -                                |
| 5.60                 | 26.00                             | 29.28                             | 36.93                            | 43.93                              | 48.11                              | -                                  | -                                | -                                |
| 6.00                 | 27.88                             | 31.53                             | 39.50                            | 47.02                              | 51.49                              | 61.00                              | 69.00                            | -                                |
| 6.35                 | 29.34                             | 33.28                             | 41.73                            | 49.67                              | 54.43                              | 62.35                              | 70.50                            | 78.50                            |
| 7.01                 | 32.27                             | 36.76                             | 46.43                            | 55.45                              | 61.82                              | 69.04                              | -                                | -                                |
| 7.94                 | -                                 | 41.00                             | 50.95                            | 61.85                              | 67.98                              | 77.92                              | 87.80                            | -                                |
| 8.18                 | -                                 | 42.56                             | 53.42                            | 65.12                              | -                                  | -                                  | -                                | -                                |
| 9.53                 | -                                 | 51.50                             | 60.24                            | 73.75                              | 81.21                              | 93.13                              | 105.00                           | 117.00                           |
| 12.70                | -                                 | -                                 | -                                | -                                  | 107.28                             | 123.30                             | 139.00                           | 155.00                           |

#### Tolerance on Thickness and Weight : as per IS 1239

The following manufacturing tolerance shall be permitted on the tubes and sockets.

- (a) Thickness
- (1) Butt welded Light tubes + Not limited  
- 8 percent
- Medium and Heavy tubes + Not Limited  
- 10 percent
- (2) Seamless tubes + Not Limited  
- 12.5 percent
- (b) Weight :
- (1) Single tube (light series) + 10 percent  
- 8 percent
- (2) Single tube (medium and heavy series) + 10 percent

#### MAXIMUM PERMISSIBLE PRESSURE AND TEMPERATURE FOR TUBES WITH STEEL COUPLINGS OR SCREWED AND SOCKETED JOINTS

| Nominal Bore                          | Maximum Permissible Pressure |                     | Maximum Permissible Temperature |  |
|---------------------------------------|------------------------------|---------------------|---------------------------------|--|
|                                       | N/mm <sup>2</sup>            | Kg./cm <sup>2</sup> | °C                              |  |
| Upto and Including 25 mm              | 1.20                         | 12.24               | 260                             |  |
| Over 25 mm upto and Including 40 mm   | 1.03                         | 10.50               | 260                             |  |
| Over 40 mm upto and Including 80 mm   | 0.86                         | 8.77                | 260                             |  |
| over 80 mm upto and including 100 mm  | 0.69                         | 7.04                | 260                             |  |
|                                       | 0.83                         | 8.47                | 177                             |  |
| Over 100 mm upto and Including 125 mm | 0.69                         | 7.04                | 171                             |  |
| Over 125 mm upto and Including 150 mm | 0.50                         | 5.10                | 160                             |  |

For tubes fitted with appropriate fittings of suitably butt welded together, the Max. permissible pressure shall be 21.00 Kg/cm<sup>2</sup> and Max. permissible temp. 260°C



## COPPER & BRASS

### Our Range of Products

| COPPER PRODUCTS |   |
|-----------------|---|
| 1.              | Copper Tube for general engineering purpose<br>Mfg. range: O.D. - 3mm to 150mm<br>W.t. - up to any thickness, subject to outside diameter<br>Grade - ETP, DLP, DHP                                    |
| 2.              | MEX Flow Tube<br>Half Hard Nitrogenised Seamless Copper Tube for Gas and Plumbing application as per B.S.EN1057 (BS 2871 Part I Table X)<br>Mfg. range: 6mm to 159 mm outside diameter<br>Grade - DHP |
| 3.              | Refrigeration Quality Copper Tube<br>Mfg. range: 3/16" & 3/4" diameter upto 27 swg in 15 & 30 mts. coil.<br>Grade - DHP   |
| 4.              | High Conductivity Copper Rods<br>Mfg. range: 6mm to 100mm diameter in straight lengths.<br>Grade - ETP  |
| 5.              | Copper Rods for general engineering purpose / Earth Rods<br>Mfg. range: 6mm to 100mm diameter<br>Earth Rods: 14.2 / 14.8 / 16mm<br>Grade - DHP  |
| 6.              | Copper Bus Bars & Strips / Tapes<br>Mfg. range: 10mm to 20mm diameter in any thickness are manufactured in straight length Coil from and also Tinned Coated<br>Grade - ETP, DHP, ETP+Ag               |
| 7.              | Copper Sheets / Earthing Sheets<br>Mfg. range: 4 x 4 feet, 5mm to 10mm and 8 x 4 feet and sizes as per customer's need.<br>Grade - ETP, DHP   |

### INTERNAL FIN TUBES

Specialised in Intergally Fin-Tubes Internal & External in all types of Copper based alloys.  
(First complete manufacturer in india)

- Copper Fin Tubes  
Mfg. range: 3/4", 5/8" Fin : 19 Fin, 26 Fin.  
26 intragues : 40 Fin, Tubro B, F, Tube

### COPPER ALLOY PRODUCTS

- Cupro Nickel Tube : 90/10, 70/30  
Mfg. range : O.D. - 3mm to 100mm  
Up to any thickness, subject to outside diameter
- Brass Tube 70:30 / 63:37 / 85:15 / Admiralty / AL Brass  
Mfg. range : O.D. - 6mm to 100mm  
W.T. - Up to any thickness, subject to outside diameter
- Brass Rod  
Mfg. range : O.D. - 6mm to 100mm Dia.
- Brass Flat/ Strips  
Mfg. range: 10mm to 200mm Dia, in any thickness
- Brass Sheets  
Mfg. range : 4 x 4 feet, 5mm to 10mm & 8 x 4 feet & Sizes as per your requirement.

We Undertakes manufacturing of tailor-made Copper-based Alloy Semis, as per the customers' specification and ensure delivery of goods to our client, even at every short notice.

### ALUMINIUM ALLOY : CHEMICAL COMPOSITION STD. (Per Cent)

| Alloy (ISS)<br>Old | Equivalent alloy (A.A.) |          | Copper |      | Magnesium |      | Silicon |      | Iron | Manganese | *Other (total) | Remark |   |
|--------------------|-------------------------|----------|--------|------|-----------|------|---------|------|------|-----------|----------------|--------|---|
|                    | New                     | U.S.A.   | Min.   | Max. | Min.      | Max. | Min.    | Max. |      |           |                |        |   |
| 1B                 | 19500                   | 1050     | —      | 0.05 | —         | —    | —       | 0.30 | 0.4  | —         | 0.05           | 0.1    | Aluminium 99.5% Min.                                      |
| 1E                 | 19501                   | 1050(EC) | —      | 0.04 | —         | —    | —       | 0.15 | 0.35 | —         | —              | 0.1    | Aluminium 99.5% Min.                                      |
|                    | 19700                   | 1070     | —      | 0.03 | —         | —    | —       | 0.20 | 0.25 | —         | 0.03           | 0.1    | Aluminium 99.7% Min.                                      |
| 1A                 | 19800                   | 1080     | —      | 0.03 | —         | —    | —       | 0.15 | 0.15 | —         | 0.03           | 0.1    | Aluminium 99.8% Min.                                      |
| 1C                 | 19900                   | 1100     | —      | 0.1  | —         | 0.2  | —       | 0.50 | 0.7  | —         | 0.1            | 0.2    | Aluminium 99.0% Min.                                      |
| —                  | —                       | 2011     | 5.0    | 6.0  | —         | 0.1  | —       | 0.4  | 0.7  | —         | 0.1            | 0.4    | Also lead & bismuth - 0.2 - 0.6% each                     |
| H15                | 24345                   | 2014     | 3.8    | 5.0  | 0.2       | 0.8  | 0.5     | 1.2  | 0.7  | 0.3       | 1.2            | 0.5    | —   |
| H14                | 24534                   | 2017     | 3.5    | 4.7  | 0.4       | 1.2  | 0.2     | 0.7  | 0.7  | 0.4       | 1.2            | 0.5    | —   |
| N3                 | 31000                   | 3003     | —      | 0.1  | —         | 0.1  | —       | 0.6  | 0.7  | 0.8       | 1.5            | 0.4    | —   |
| N21                | 43000                   | 4043     | —      | 0.1  | —         | 0.2  | 4.5     | 6.0  | 0.6  | —         | 0.5            | 0.5    | —   |
| N2                 | 46000                   | 4047     | —      | 0.1  | —         | 0.2  | 10.0    | 13.0 | 0.6  | —         | 0.5            | 0.5    | —   |
| N4                 | 52000                   | 5052     | —      | 0.1  | 1.7       | 2.6  | —       | 0.6  | 0.7  | —         | 0.5            | 0.4    | —   |
| N5                 | 53000                   | 5086     | —      | 0.1  | 2.8       | 4.0  | —       | 0.6  | 0.7  | —         | 0.5            | 0.4    | —   |
| N6                 | 55000                   | 5056     | —      | 0.1  | 4.5       | 5.0  | —       | 0.6  | 0.7  | —         | 1.01           | 0.4    | Chromium upto 0.25  |
| N8                 | 54300                   | 5083     | —      | 0.1  | 4.0       | 4.9  | —       | 0.4  | 0.7  | 0.5       | 1.0            | 0.4    | Chromium upto 0.25  |
| H20                | 65032                   | 6061     | 0.15   | 0.4  | 0.8       | 1.2  | 0.4     | 0.8  | 0.7  | 0.2       | 0.8            | 0.4    | Chromium (0.15 - 0.35)<br>Either Mn, Cr Shall be present. |
| H9                 | 63400                   | 6063     | —      | 0.1  | 0.4       | 0.9  | 0.3     | 0.7  | 0.6  | —         | 0.3            | 0.4    | Chromium upto 0.10  |
| —                  | —                       | 6066     | 0.7    | 1.2  | 0.8       | 1.4  | 0.9     | 1.8  | 0.7  | 0.6       | 1.1            | 0.4    | —   |
| —                  | 64423                   | —        | 0.5    | 1.0  | 0.5       | 1.3  | 0.7     | 1.3  | 0.8  | 1.0       | —              | —      | —   |
| 91E                | 63401                   | 6101     | —      | 0.1  | 0.35      | 0.8  | 0.3     | 0.7  | 0.5  | —         | 0.03           | 0.1    | —   |
| —                  | 64401                   | 6201     | —      | 0.1  | 0.6       | 0.9  | 0.5     | 0.9  | 0.5  | —         | 0.03           | 0.1    | —   |
| H30                | 64430                   | 6351     | —      | 0.1  | 0.4       | 1.2  | 0.6     | 1.3  | 0.6  | 0.4       | 1.0            | 0.3    | Chromium upto 0.25  |
| —                  | 74530                   | 7039     | —      | 0.2  | 1.0       | 1.5  | —       | 0.4  | 0.7  | 0.2       | 0.7            | 0.4    | Zinc (4 - 5%)   |
| —                  | —                       | 7075     | 1.20   | 2.0  | 2.1       | 2.9  | —       | 0.4  | 0.5  | —         | 0.3            | 0.5    | Zinc (5.1 - 6.4) & Chromium (0.1 - 0.25)                  |



### CHEMICAL COMPOSITION OF ALLOY STEELS

| Steel Type               | Quality                              | AISI         | C              | Si             | Mn                     | Cr                     | W                      | V             | Co            | Mo            | Ni            |
|--------------------------|--------------------------------------|--------------|----------------|----------------|------------------------|------------------------|------------------------|---------------|---------------|---------------|---------------|
| High Speed Steel         | 18 % W                               | T1           | 0.75           | 0.40           | 0.40                   | 4.30                   | 18.0                   | 1.00          | —             | —             | —             |
|                          | 18% W + 5 % Co                       | T4           | 0.80           | 0.40           | 0.40                   | 4.30                   | 18.0                   | 1.60          | 5.0           | 0.80          | —             |
|                          | 18% W + 10 % Co<br>6/5/2             | T5           | 0.75           | 0.40           | 0.40                   | 4.30                   | 18.0                   | 1.60          | 9.5           | 0.80          | —             |
|                          |                                      | M2           | 0.80           | 0.40           | 0.40                   | 4.30                   | 6.5                    | 2.00          | —             | 5.00          | —             |
| Hot Work Steel           | 9 % W<br>5 % Cr                      | H21          | 0.30           | 0.20           | 0.30                   | 2.60                   | 8.5                    | 0.40          | —             | —             | —             |
|                          |                                      | H11          | 0.36           | 1.00           | 0.40                   | 5.00                   | —                      | 0.40          | —             | 0.10          | —             |
| Non Shrinking Die Steel  | HCHC<br>*<br>OHNS<br>*<br>*<br>E0300 | D3           | 2.0            | 0.30           | 0.30                   | 12.00                  | —                      | —             | —             | —             | —             |
|                          |                                      | D2           | 1.70           | 0.30           | 0.30                   | 12.00                  | 0.5                    | 0.10          | —             | 0.60          | —             |
|                          |                                      | O1           | 0.95           | —              | 1.00                   | 0.50                   | 0.5                    | 0.10          | —             | —             | —             |
|                          |                                      | O2           | 0.90           | 0.20           | 1.90                   | 0.30                   | —                      | 0.10          | —             | —             | —             |
|                          |                                      | E0300        | 1.00           | 0.40           | 1.00                   | 1.00                   | —                      | 0.10          | —             | 0.10          | —             |
| Pneumatic Steel          |                                      | S2           | 0.48           | 0.90           | 0.30                   | 1.10                   | 1.90                   | 0.20          | —             | —             | —             |
| Shock Resisting Steel    | V6N                                  |              | 0.90           | —              | —                      | —                      | —                      | 0.20          | —             | —             | 0.70          |
| Stainless Steel          | Magnetic<br>Non-Magnetic             | 410          | 0.10           | 0.75           | 1.00                   | 13.00                  | —                      | —             | —             | —             | 0.60          |
|                          |                                      | 304          | 0.08           | 1.00           | 2.00                   | 18.00                  | —                      | —             | —             | —             | 10.00         |
| Carbon Tool Steel        |                                      | 1095         | 0.90           | 0.20           | 0.40                   | —                      | —                      | —             | —             | —             | —             |
| Constructional Steel     | EN-8                                 | 1040         | 0.35/<br>0.45  | 0.10/<br>0.35  | 0.60/<br>0.90          | —                      | S&P                    | each<br>(MAX) | 0.06          | —             | —             |
|                          |                                      |              | EN-9           | 1055           | 0.45/<br>0.60          | 0.10/<br>0.35          | 0.50/<br>0.80          | —             | S&P           | each<br>(MAX) | 0.06          |
|                          | EN-19                                | 4140         | 0.35/<br>0.45  | 0.10/<br>0.35  | 0.50/<br>0.80          | 0.90/<br>1.50          | S&P                    | each<br>(MAX) | 0.05          | 0.20/<br>0.40 | —             |
|                          |                                      |              | EN-24          | 4340           | 0.35/<br>0.45          | 0.10/<br>0.35          | 0.45/<br>0.70          | 0.90/<br>1.40 | S&P           | each<br>(MAX) | 0.05          |
|                          | EN-30 B                              |              | 0.26/<br>0.34  | 0.10/<br>0.35  | 0.40<br>0.60           | 1.10/<br>1.40          | S&P                    | each<br>(MAX) | 0.05          | 0.20/<br>0.40 | 3.90/<br>4.30 |
|                          |                                      |              | EN-31          | 52100          | 0.95/<br>1.20          | 0.10/<br>3.35          | 0.30<br>0.75           | 1.00/<br>1.60 | S&P           | each<br>(MAX) | 0.025         |
|                          | EN-36                                | 3310         | 0.15/<br>0.35  | 0.10/<br>0.35  | 0.30<br>0.60           | 0.60/<br>1.10          | S&P                    | each<br>(MAX) | 0.05          | —             | 3.00<br>3.75  |
|                          |                                      |              | Sprining Steel | EN-45<br>EN-47 | 9255<br>6150           | 0.50/<br>0.60          | 1.50/<br>2.00          | 0.70<br>1.00  | S&P           | each<br>(MAX) | 0.05          |
|                          | 0.45/<br>0.55                        | 0.50<br>0.80 |                |                |                        | 0.50<br>0.80           | 0.80/<br>1.20          | S&P           |               |               |               |
|                          | Case Hardening Steel                 | SAE          | 8620           | 0.18/<br>6.23  | 0.20<br>0.35           | 0.70<br>0.90           | 0.40<br>0.60           | S&P           | each<br>(MAX) | 0.04          | 0.15/<br>0.26 |
| 16 M/N Cr5<br>20 M/N Cr5 |                                      |              |                | —              | 0.14-0.19<br>0.17-0.22 | 0.17-0.37<br>1.17-0.37 | 1.00-1.30<br>1.10-1.40 |               |               |               |               |

Notes : O = Oil; CA = Compressed Air.; M = Martempering bath; W = Water; A = Air



## NICKEL BASE ALLOYS

### NOMINAL CHEMICAL COMPOSITION, % (not for specification purposes)

| Nickel            | Ni       | C          | Mn       | Fe     | S        | Si        | Cu       | Cr           | Co        | Mo             | Al          | Ti          | Other                             |
|-------------------|----------|------------|----------|--------|----------|-----------|----------|--------------|-----------|----------------|-------------|-------------|-----------------------------------|
| Nickel200         | 99.2     | 0.10       | 0.3      | 0.4    | 0.005    | 0.18      | 0.10     | -            | 0.25      | -              | -           | -           | -                                 |
| Nickel201         | 99.0     | 0.02       | 0.35     | 0.4    | 0.005    | 0.18      | 0.25     | -            | 0.25      | -              | -           | -           | -                                 |
| Nickel205         | 99.6     | 0.02       | 0.3      | 0.2    | 0.004    | 0.08      | 0.05     | -            | 0.1       | -              | -           | 0.03 Mg     | 0.05                              |
| Nickel212         | 97.7     | 0.010      | 2.0      | 0.05   | 0.005    | 0.05      | 0.03     | -            | -         | -              | -           | -           | -                                 |
| Nickel222         | 99.5     | 0.01       | 0.02     | 0.04   | 0.0025   | 0.01      | 0.01     | 0.01         | 0.06      | 0.01           | 0.01        | Mg0.08      | -                                 |
| Nickel270         | 99.98    | 0.01       | 0.003    | <0.001 | <0.001   | <0.001    | <0.001   | <0.001       | -         | -              | <0.001      | Mg<0.001    | -                                 |
| K.MONEL alloy 400 | Ni       | C          | Mn       | Fe     | S        | Si        | Cu       | Cr           | Co        | Mo             | Al          | Ti          | Other                             |
| K.MONEL alloy 400 | 63.0 min | 0.15       | 1.25 max | 2.5max | 0.024max | 0.05max   | 31.0     | -            | -         | -              | -           | -           | -                                 |
| K.MONEL alloy 500 | 63.0 min | 0.25       | 1.5 max  | 2.0max | 0.010max | 0.5       | 30.0     | -            | -         | -              | 2.9         | 0.6         | -                                 |
| Cast MONEL alloy  | 63.0 min | 0.07       | 0.75     | 2.5max | 0.02 max | 0.04max   | 30.0     | 0.10max      | -         | 0.20max        | 0.05max     | 0.01max     | -                                 |
| Cast MONEL alloy  | 63.0 min | 0.03max    | 0.020max | 2.5max | 0.02max  | 0.04max   | 30.0     | 0.10         | -         | 0.20max        | 0.05max     | 0.01max     | -                                 |
| INCONEL alloy 600 | Ni       | C          | Mn       | Fe     | S        | Si        | Cu       | Cr           | Co        | Mo             | Al          | Ti          | Other                             |
| INCONEL alloy 600 | 72.0 min | 0.025 max  | 1.0 max  | 8.0    | 0.05 max | 0.05max   | 0.05 max | 14 - 17      | -         | -              | -           | -           | Nb +                              |
| INCONEL alloy 625 | Bal      | 0.025max   | 0.25     | 3.0max | 0.015max | 0.5 max   | -        | 21 - 23      | -         | 8 - 10         | 0.25        | 0.25        | 3.65                              |
| INCOLOY alloy 800 | Ni       | C          | Mn       | Fe     | S        | Si        | Cu       | Cr           | Co        | Mo             | Al          | Ti          | Other                             |
| INCOLOY alloy 800 | 32 - 34  | 0.025max   | 1.5max   | Bal.   | 0.015max | -         | 0.75 max | 20 - 22      | 0.5 max   | -              | 0.15 - 0.40 | 0.35 - 0.60 | Al + Ti max. 1.0                  |
| INCOLOY alloy 825 | 38 - 46  | 0.025max   | 1.0max   | Bal.   | 0.03 max | 0.5max    | 2.25     | 19.5 - 23.5  | 1.5 - 3   | 2.5 - 3.5      | 0.20max     | 0.9         | Ti 0.6 - 1.2                      |
| INCOLOY alloy 904 | 32.5     | 0.025      | 0.025    | Bal.   | 0.015    | 0.25      | 0.25     | -            | 14.5      | -              | 0.1         | 1.6         | -                                 |
| INCOLOY alloy DS  | 37.0     | 0.10 max   | 0.21 max | Bal.   | -        | 2.3 max   | 2.3 max  | 18.0         | -         | -              | -           | -           | -                                 |
| Hastalloy C22     | Ni       | C          | Mn       | Fe     | S        | Si        | Cu       | Cr           | Co        | Mo             | Al          | Ti          | Other                             |
| Hastalloy C22     | Bal      | 0.010 max  | -        | 2 - 6  | -        | 0.08 max. | -        | 20 - 22.5    | 2.5 max.  | 12.5-14.5      | 2.50        | Co          | W-2.50 3.50                       |
| Hastalloy C-276   | Bal      | 0.010 max  | 1.00     | 5.50   | -        | -         | -        | 15 - 16.5    | 15 - 16.5 | 15 - 17        | -           | -           | W-3.75uV.1-0.3<br>Si-0.02 Co-2.50 |
| Hastalloy C-4     | Bal      | 0.009 max. | 1.00     | 3.00   | 0.7      | -         | -        | 14.5<br>17.5 | 5.575     | 14.00<br>17.00 | -           | 0.70        | Co-2.00 Si-0.05<br>P-0.04         |

### PHYSICAL AND MECHANICAL PROPERTIES

|                   | Density<br>Kg/dm <sup>3</sup> | Melting Range<br>°C | Specific heat<br>at 20 °C<br>J/Kg°C | Thermal<br>Conductivity<br>at 20 °C W/m°C | Thermal<br>Expansion<br>10-6 °C<br>20-95 °C | Electrical<br>resistivity<br>at 20 °C<br>microhm cm | Tensile<br>strength<br>N/mm <sup>2</sup> | Hardness<br>HV |
|-------------------|-------------------------------|---------------------|-------------------------------------|---|---|---|--|----------------|
| Nickel 200        | 8.89                          | 1435-1445           | 456                                 | 74.9                                      | 13.3  | 9.5   | 380-550                                  | 90-120         |
| Nickel 201        | 8.89                          | 1435-1445           | 456                                 | 79.2                                      | 13.3  | 7.6   | 340-410                                  | 75-100         |
| Nickel 205        | 8.89                          | 1435-1445           | 456                                 | 74.9                                      | 13.3  | 9.5   | 340                                      | 77             |
| Nickel 212        | 8.86                          | 1435-1445           | 430                                 | 44.1                                      | -   | 10.9  | 476                                      | 144            |
| Nickel 222        | 8.89                          | 1435-1445           | 456                                 | 74.9                                      | 13.3  | 8.8   | 340                                      | 77             |
| Nickel 270        | 8.89                          | 1455                | 460                                 | 85.7                                      | 13.3  | 7.5   | 340                                      | 80             |
| Monel alloy 400   | 8.83                          | 1300-1350           | 419                                 | 21.7                                      | 14.1  | 51.0  | 480-620                                  | 111-151        |
| Monel alloy k-500 | 8.46                          | 1315-1350           | 419                                 | 17.4                                      | 13.7  | 61.4  | 620-760                                  | 141-189        |
| Inconel alloy 600 | 8.42                          | 1370-1425           | 461                                 | 14.8                                      | 13.3  | 103   | 550-690                                  | 121-173        |
| Inconel alloy 625 | 8.44                          | 1290-1350           | 410                                 | 9.8                                       | 12.8  | 129   | 830-1040                                 | 146-247        |
| Incoloy alloy 800 | 7.95                          | 1355-1385           | 502                                 | 11.7                                      | 14.2  | 99  | 520-700                                  | 121-188        |
| Incoloy alloy 825 | 8.14                          | 1370-1400           | 441                                 | 10.9                                      | 14.0  | 113   | 580-730                                  | 121-183        |
| Incoloy alloy 904 | 8.12                          | -                   | 442                                 | 14.9                                      | 4.6   | 72  | 923                                      | -              |
| Incoloy alloy DS  | 7.92                          | 1330-1400           | 452                                 | 12.0                                      | 14.1  | 108   | 680                                      | 208            |



## APPLICATION INDUSTRIES

- Textile Industries
- Cement Industries
- Paper & Pulp Mills
- Sugar Industries
- Water Piping Systems
- Refinery Plants
- Power Plant
- Chemical & Fertilizers
- Beverage Industries
- Pharmacy Industries
- Food Industries
- Oil & Gas Industries

We are one of the leading manufacturer, Exporter & well Diversified Groups supplying to more than 90 countries dealing in Stainless Steel, Carbon Steel & Alloy Steel Since 1991.



# SACHIYA STEEL INTERNATIONAL

(A HUB OF QUALITY)

MANUFACTURERS OF :

TUBES | PIPES | PIPE FITTINGS | FORGED FITTINGS | FLANGES | FASTENERS

IN STAINLESS STEEL | MILD STEEL | NICKEL ALLOYS | ALUMINIUM ALLOYS

INCO ALLOYS | TITANIUM ALLOYS | SQUARE PIPES | SHEETS | SQUARE RODS | ROUND BARS | HEX BARS

**Head Office :**

D-3, Ground Flr, Bharat Nagar Society, Grant Road (E), Mumbai-400007

Tel No.: 022-66518863 | Mob.: +91 9769056007 | Mob.: +91 9137972560

E-mail : [sales@sachiyasteel.com](mailto:sales@sachiyasteel.com) | [export@sachiyasteel.com](mailto:export@sachiyasteel.com) | [connectsachiyasteel@gmail.com](mailto:connectsachiyasteel@gmail.com)

Website : [www.sachiyasteel.com](http://www.sachiyasteel.com)