



# **OCTG**

## **Specification & Technical Details**



## PHYSICAL PROPERTIES

|                            | Grade | Longitudinal   |             | Circumferential               |                         | Hardness<br>max. | Charpy<br>Value<br>ft-lbs | V-Notch<br>Temp.<br>°F | (CVN)<br>Orient | Source |
|----------------------------|-------|----------------|-------------|-------------------------------|-------------------------|------------------|---------------------------|------------------------|-----------------|--------|
|                            |       | Yield Strength |             | Compression                   | Tensile                 |                  |                           |                        |                 |        |
|                            |       | min.<br>psi    | max.<br>psi | Yield Strength<br>min.<br>psi | Strength<br>max.<br>psi |                  |                           |                        |                 |        |
| <b>API General Service</b> | H-40  | 40000          | 80000       |                               | 60000                   |                  |                           |                        |                 | API    |
|                            | J-55  | 55000          | 80000       |                               | 75000                   |                  |                           |                        |                 | API    |
|                            | K-55  | 55000          | 80000       |                               | 95000                   |                  |                           |                        |                 | API    |
| <b>API Sour Service</b>    | M-65  | 65000          | 85000       |                               | 85000                   | 22 Rc            | 20                        | 32                     | TW              | API    |
|                            | L-80  | 80000          | 95000       |                               | 95000                   | 23 Rc            |                           |                        |                 | API    |
|                            | C-90  | 90000          | 105000      |                               | 100000                  | 25.4 Rc          |                           |                        |                 | API    |
|                            | T-95  | 95000          | 110000      |                               | 105000                  | 25.4 Rc          |                           |                        |                 | API    |
| <b>API High-Strength</b>   | N-80  | 80000          | 110000      |                               | 100000                  |                  |                           |                        |                 | API    |
|                            | C-95  | 95000          | 110000      |                               | 105000                  |                  |                           |                        |                 | API    |
|                            | P-110 | 110000         | 140000      |                               | 125000                  |                  |                           |                        |                 | API    |
|                            | Q-125 | 125000         | 150000      |                               | 135000                  |                  | 20                        | 32                     | TW              | API    |



## AVAILABLE GRADES AND SIZES

| CASING      |       |       |       |       |       |       |       |
|-------------|-------|-------|-------|-------|-------|-------|-------|
| Size<br>in. | J-55  |       |       | N-80  |       |       |       |
|             | H-40  | K-55  | M-65  | L-80  | C-95  | P-110 | Q-125 |
| 4.500       | 9.50  | 9.50  | 9.50  | ..... | ..... | ..... | ..... |
| 4.500       | ..... | 10.50 | 10.50 | ..... | ..... | ..... | ..... |
| 5.750       | ..... | ..... | ..... | 21.80 | 21.80 | 21.80 | ..... |
| 5.750       | ..... | ..... | ..... | 24.40 | 24.40 | 24.40 | ..... |
| 7.000       | 17.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| 7.000       | 20.00 | 20.00 | 20.00 | ..... | ..... | ..... | ..... |
| 7.000       | ..... | 23.00 | 23.00 | 23.00 | 23.00 | ..... | ..... |
| 7.000       | ..... | 26.00 | 26.00 | 26.00 | 26.00 | 26.00 | ..... |
| 7.000       | ..... | ..... | ..... | 29.00 | 29.00 | 29.00 | 29.00 |
| 7.000       | ..... | ..... | ..... | 32.00 | 32.00 | 32.00 | 32.00 |
| 7.000       | ..... | ..... | ..... | 35.00 | 35.00 | 35.00 | 35.00 |
| 7.000       | ..... | ..... | ..... | 38.00 | 38.00 | 38.00 | 38.00 |
| 7.000       | ..... | ..... | ..... | ..... | ..... | 41.00 | 41.00 |
| 7.625       | 24.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| 7.625       | ..... | 26.40 | 26.40 | 26.40 | 26.40 | ..... | ..... |
| 7.625       | ..... | ..... | 29.70 | 29.70 | 29.70 | 29.70 | ..... |
| 7.625       | ..... | ..... | ..... | 33.70 | 33.70 | 33.70 | 33.70 |
| 7.625       | ..... | ..... | ..... | 39.00 | 39.00 | 39.00 | 39.00 |
| 7.625       | ..... | ..... | ..... | 42.80 | 42.80 | 42.80 | 42.80 |
| 7.625       | ..... | ..... | ..... | 45.30 | ..... | 45.30 | 45.30 |
| 7.625       | ..... | ..... | ..... | 47.10 | 47.10 | 47.10 | 47.10 |
| 7.625       | ..... | ..... | 46.10 | ..... | 46.10 | 46.10 | ..... |
| 8.625       | ..... | 24.00 | 24.00 | ..... | ..... | ..... | ..... |
| 8.625       | 28.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| 8.625       | 32.00 | 32.00 | 32.00 | ..... | ..... | ..... | ..... |
| 8.625       | ..... | 36.00 | 36.00 | 36.00 | 36.00 | ..... | ..... |
| 8.625       | ..... | ..... | 40.00 | 40.00 | 40.00 | 40.00 | ..... |
| 8.625       | ..... | ..... | ..... | 44.00 | 44.00 | 44.00 | ..... |
| 8.625       | ..... | ..... | ..... | 49.00 | 49.00 | 49.00 | 49.00 |
| 9.375       | ..... | ..... | ..... | ..... | ..... | 39.00 | 39.00 |
| 9.625       | 32.30 | ..... | ..... | ..... | ..... | ..... | ..... |
| 9.625       | 36.00 | 36.00 | 36.00 | ..... | ..... | ..... | ..... |
| 9.625       | ..... | 40.00 | 40.00 | 40.00 | 40.00 | ..... | ..... |
| 9.625       | ..... | ..... | 43.50 | 43.50 | 43.50 | 43.50 | 43.50 |
| 9.625       | ..... | ..... | ..... | 47.00 | 47.00 | 47.00 | 47.00 |
| 9.625       | ..... | ..... | ..... | 53.50 | 53.50 | 53.50 | 53.50 |
| 9.625       | ..... | ..... | ..... | 58.40 | 58.40 | 58.40 | ..... |
| 9.750       | ..... | ..... | ..... | ..... | ..... | 59.20 | 59.20 |
| 9.875       | ..... | ..... | ..... | ..... | ..... | 62.80 | 62.80 |
| 10.750      | 32.75 | ..... | ..... | ..... | ..... | ..... | ..... |
| 10.750      | 40.50 | 40.50 | 40.50 | 40.50 | ..... | ..... | ..... |
| 10.750      | ..... | 45.50 | 45.50 | 45.50 | ..... | ..... | ..... |
| 10.750      | ..... | 51.00 | 51.00 | 51.00 | 51.00 | 51.00 | 51.00 |
| 10.750      | ..... | ..... | 55.50 | 55.50 | 55.50 | 55.50 | 55.50 |
| 10.750      | ..... | ..... | ..... | 60.70 | ..... | 60.70 | 60.70 |
| 10.750      | ..... | ..... | ..... | 65.70 | ..... | 65.70 | 65.70 |
| 10.750      | ..... | ..... | ..... | ..... | ..... | 71.10 | 71.10 |
| 11.750      | 42.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| 11.750      | ..... | 47.00 | 47.00 | ..... | ..... | ..... | ..... |
| 11.750      | ..... | 54.00 | 54.00 | ..... | ..... | ..... | ..... |
| 11.750      | ..... | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 |
| 11.750      | ..... | ..... | ..... | 65.00 | ..... | 65.00 | 65.00 |
| 11.750      | ..... | ..... | ..... | ..... | ..... | 71.10 | 71.10 |
| 11.750      | ..... | ..... | ..... | ..... | ..... | 71.80 | 71.80 |
| 13.375      | 48.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| 13.375      | ..... | 54.50 | 54.50 | ..... | ..... | ..... | ..... |
| 13.375      | ..... | 61.00 | 61.00 | ..... | ..... | ..... | ..... |
| 13.375      | ..... | 68.00 | 68.00 | 68.00 | 68.00 | 68.00 | ..... |
| 13.375      | ..... | ..... | 72.00 | 72.00 | 72.00 | 72.00 | 72.00 |
| 13.375      | ..... | ..... | ..... | ..... | ..... | 80.70 | 80.70 |
| 13.375      | ..... | ..... | ..... | ..... | ..... | 86.00 | 86.00 |
| 13.500      | ..... | ..... | ..... | ..... | ..... | 81.40 | 81.40 |
| 13.625      | ..... | ..... | ..... | ..... | ..... | 88.20 | 88.20 |
| 16.000      | 65.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| 16.000      | ..... | 75.00 | 75.00 | ..... | ..... | ..... | ..... |
| 16.000      | ..... | 84.00 | 84.00 | 84.00 | ..... | 84.00 | 84.00 |
| 16.000      | ..... | ..... | ..... | 95.00 | ..... | 95.00 | 95.00 |
| 16.000      | ..... | ..... | ..... | 97.00 | ..... | 97.00 | 97.00 |

| TUBING      |       |       |       |              |
|-------------|-------|-------|-------|--------------|
| NON-UPSET   |       |       |       |              |
| Size<br>in. | H-40  | J-55  | M-65  | N-80<br>L-80 |
| 1.050       | ..... | 1.14  | ..... | 1.14         |
| 1.315       | ..... | 1.70  | ..... | 1.70         |
| 1.660       | ..... | 2.30  | ..... | 2.30         |
| 2.375       | ..... | 4.00  | ..... | 4.00         |
| 2.375       | 4.60  | 4.60  | 4.60  | 4.60         |
| 2.375       | ..... | ..... | ..... | 5.80         |
| 2.875       | 6.40  | 6.40  | 6.40  | 6.40         |
| 2.875       | ..... | ..... | ..... | 7.80         |
| 2.875       | ..... | ..... | ..... | 8.60         |
| 3.500       | 9.20  | 9.20  | 9.20  | 9.20         |
| 3.500       | 10.20 | 10.20 | 10.20 | 10.20        |

| TUBING      |       |       |       |              |
|-------------|-------|-------|-------|--------------|
| UPSET       |       |       |       |              |
| Size<br>in. | H-40  | J-55  | M-65  | N-80<br>L-80 |
| 1.050       | ..... | 1.20  | ..... | 1.20         |
| 1.315       | ..... | 1.80  | ..... | 1.80         |
| 1.660       | ..... | 2.40  | ..... | 2.40         |
| 2.375       | ..... | 4.00  | ..... | 4.00         |
| 2.375       | 4.70  | 4.70  | 4.70  | 4.70         |
| 2.375       | ..... | ..... | ..... | 5.95         |
| 2.875       | 6.50  | 6.50  | 6.50  | 6.50         |
| 2.875       | ..... | ..... | ..... | 7.90         |
| 2.875       | ..... | ..... | ..... | 8.70         |
| 3.500       | 9.30  | 9.30  | 9.30  | 9.30         |



## TUBING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size<br>O.D. in. | Nominal Weight<br>lbs/ft |            | Grade | Collapse<br>Resistance<br>psi | Internal Yield<br>Pressure at Minimum Yield , psi |                 |              |               | Joint Strength, lbs |                 |            | Pipe<br>Body |             |            |              |       |       |
|------------------|--------------------------|------------|-------|-------------------------------|---|-----------------|--------------|---------------|---------------------|-----------------|------------|--------------|-------------|------------|--------------|-------|-------|
|                  | NUE<br>T&C               | EUE<br>T&C |       |                               | PE,<br>NUE<br>T&C                                 | Buttress<br>T&C | Reg.<br>Cpl. | Spec.<br>Cpl. | NUE<br>T&C          | Buttress<br>T&C | EUE<br>T&C | Yield<br>lbs | Wall<br>in. | ID.<br>in. | Drift<br>in. |       |       |
| 1.050            | 1.14                     | 1.20       | H-40  | 7680                          | 7530  |                 |              | 7530          |                     |                 | 6360       |              | 13300       | 13300      | 0.113        | 0.824 | 0.730 |
| 1.050            | 1.14                     | 1.20       | J-55  | 10560                         | 10360   |                 |              | 10360         |                     |                 | 8740       |              | 18300       | 18300      | 0.113        | 0.824 | 0.730 |
| 1.050            | 1.14                     | 1.20       | M-65  | 12480                         | 12240   |                 |              | 12240         |                     |                 | 10330      |              | 21600       | 21600      | 0.113        | 0.824 | 0.730 |
| 1.050            | 1.14                     | 1.20       | L-80  | 15370                         | 15070   |                 |              | 15070         |                     |                 | 12720      |              | 26600       | 26600      | 0.113        | 0.824 | 0.730 |
| 1.050            | 1.14                     | 1.20       | N-80  | 15370                         | 15070   |                 |              | 15070         |                     |                 | 12720      |              | 26600       | 26600      | 0.113        | 0.824 | 0.730 |
| 1.050            | 1.14                     | 1.20       | C-90  | 17290                         | 16950   |                 |              | 16950         |                     |                 | 14300      |              | 29900       | 29900      | 0.113        | 0.824 | 0.730 |
| 1.050            | 1.14                     | 1.20       | T-95  | 18250                         | 17890   |                 |              | 17890         |                     |                 | 15100      |              | 31600       | 31600      | 0.113        | 0.824 | 0.730 |
| 1.315            | 1.70                     | 1.80       | H-40  | 7270                          | 7080  |                 |              | 7080          |                     |                 | 10960      |              | 19800       | 19800      | 0.133        | 1.049 | 0.955 |
| 1.315            | 1.70                     | 1.80       | J-55  | 10000                         | 9730  |                 |              | 9730          |                     |                 | 15060      |              | 27200       | 27200      | 0.133        | 1.049 | 0.955 |
| 1.315            | 1.70                     | 1.80       | M-65  | 11820                         | 11500   |                 |              | 11500         |                     |                 | 17800      |              | 32100       | 32100      | 0.133        | 1.049 | 0.955 |
| 1.315            | 1.70                     | 1.80       | L-80  | 14550                         | 14160   |                 |              | 14160         |                     |                 | 21910      |              | 39500       | 39500      | 0.133        | 1.049 | 0.955 |
| 1.315            | 1.70                     | 1.80       | N-80  | 14550                         | 14160   |                 |              | 14160         |                     |                 | 21910      |              | 39500       | 39500      | 0.133        | 1.049 | 0.955 |
| 1.315            | 1.70                     | 1.80       | C-90  | 16360                         | 15930   |                 |              | 15930         |                     |                 | 24650      |              | 44400       | 44400      | 0.133        | 1.049 | 0.955 |
| 1.315            | 1.70                     | 1.80       | T-95  | 17270                         | 16810   |                 |              | 16810         |                     |                 | 26020      |              | 46900       | 46900      | 0.133        | 1.049 | 0.955 |
| 1.660            | 2.30                     | 2.40       | H-40  | 6180                          | 5900  |                 |              | 5900          |                     |                 | 15530      |              | 26700       | 26700      | 0.140        | 1.380 | 1.286 |
| 1.660            | 2.30                     | 2.40       | J-55  | 8490                          | 8120  |                 |              | 8120          |                     |                 | 21360      |              | 36800       | 36800      | 0.140        | 1.380 | 1.286 |
| 1.660            | 2.30                     | 2.40       | M-65  | 10040                         | 9590  |                 |              | 9590          |                     |                 | 25240      |              | 43500       | 43500      | 0.140        | 1.380 | 1.286 |
| 1.660            | 2.30                     | 2.40       | L-80  | 12360                         | 11810   |                 |              | 11810         |                     |                 | 31060      |              | 53500       | 53500      | 0.140        | 1.380 | 1.286 |
| 1.660            | 2.30                     | 2.40       | N-80  | 12360                         | 11810   |                 |              | 11810         |                     |                 | 31060      |              | 53500       | 53500      | 0.140        | 1.380 | 1.286 |
| 1.660            | 2.30                     | 2.40       | C-90  | 13900                         | 13280   |                 |              | 13280         |                     |                 | 34900      |              | 60200       | 60200      | 0.140        | 1.380 | 1.286 |
| 1.660            | 2.30                     | 2.40       | T-95  | 14670                         | 14020   |                 |              | 14020         |                     |                 | 36900      |              | 63500       | 63500      | 0.140        | 1.380 | 1.286 |
| 1.900            | 2.75                     | 2.90       | H-40  | 5640                          | 5340  |                 |              | 5340          |                     |                 | 19100      |              | 32000       | 32000      | 0.145        | 1.610 | 1.516 |
| 1.900            | 2.75                     | 2.90       | J-55  | 7750                          | 7350  |                 |              | 7350          |                     |                 | 26300      |              | 44000       | 44000      | 0.145        | 1.610 | 1.516 |
| 1.900            | 2.75                     | 2.90       | M-65  | 9160                          | 8680  |                 |              | 8680          |                     |                 | 31000      |              | 52000       | 52000      | 0.145        | 1.610 | 1.516 |
| 1.900            | 2.75                     | 2.90       | L-80  | 11280                         | 10680   |                 |              | 10680         |                     |                 | 38200      |              | 64000       | 64000      | 0.145        | 1.610 | 1.516 |
| 1.900            | 2.75                     | 2.90       | N-80  | 11280                         | 10680   |                 |              | 10680         |                     |                 | 38200      |              | 64000       | 64000      | 0.145        | 1.610 | 1.516 |
| 1.900            | 2.75                     | 2.90       | C-90  | 12620                         | 12020   |                 |              | 12020         |                     |                 | 43000      |              | 72000       | 72000      | 0.145        | 1.610 | 1.516 |
| 1.900            | 2.75                     | 2.90       | T-95  | 13440                         | 12690   |                 |              | 12690         |                     |                 | 45300      |              | 75900       | 75900      | 0.145        | 1.610 | 1.516 |
| 2.063            |                          | 3.25       | H-40  | 5590                          | 5290  |                 |              | 5290          |                     |                 |            |              | 35700       | 37400      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | J-55  | 7690                          | 7280  |                 |              | 7280          |                     |                 |            |              | 49100       | 51400      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | M-65  | 9090                          | 8600  |                 |              | 8600          |                     |                 |            |              | 57900       | 60700      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | L-80  | 11180                         | 10590   |                 |              | 10590         |                     |                 |            |              | 71400       | 74800      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | N-80  | 11180                         | 10590   |                 |              | 10590         |                     |                 |            |              | 71400       | 74800      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | C-90  | 12420                         | 11910   |                 |              | 11910         |                     |                 |            |              | 80240       | 84100      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | T-95  | 13240                         | 12570   |                 |              | 12570         |                     |                 |            |              | 84700       | 88800      | 0.156        | 1.751 | 1.657 |
| 2.063            |                          | 3.25       | P-110 | 15680                         | 14560   |                 |              | 14560         |                     |                 |            |              | 98100       | 102800     | 0.156        | 1.751 | 1.657 |
| 2.375            | 4.00                     |            | H-40  | 5230                          | 4920  |                 |              |               |                     |                 | 30100      |              |             | 46300      | 0.167        | 2.041 | 1.947 |
| 2.375            | 4.00                     |            | J-55  | 7190                          | 6770  |                 |              |               |                     |                 | 41400      |              |             | 63700      | 0.167        | 2.041 | 1.947 |
| 2.375            | 4.00                     |            | L-80  | 9980                          | 9840  |                 |              |               |                     |                 | 60300      |              |             | 92700      | 0.167        | 2.041 | 1.947 |
| 2.375            | 4.00                     |            | N-80  | 9980                          | 9840  |                 |              |               |                     |                 | 60300      |              |             | 92700      | 0.167        | 2.041 | 1.947 |
| 2.375            | 4.00                     |            | C-90  | 10940                         | 11070   |                 |              |               |                     |                 | 67800      |              |             | 104300     | 0.167        | 2.041 | 1.947 |
| 2.375            | 4.00                     |            | T-95  | 11410                         | 11690   |                 |              |               |                     |                 | 71600      |              |             | 110000     | 0.167        | 2.041 | 1.947 |
| 2.375            | 4.60                     | 4.70       | H-40  | 5890                          | 5600  | 5600            | 5600         | 5600          | 5600                | 5600            | 36000      | 52200        | 52200       | 52200      | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | J-55  | 8100                          | 7700  | 7700            | 7700         | 7700          | 7700                | 7700            | 49500      | 71700        | 71700       | 71700      | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | M-65  | 9570                          | 9100  | 9100            | 9100         | 9100          | 9100                | 9100            | 58400      | 84800        | 84800       | 84800      | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | L-80  | 11780                         | 11200   | 11200           | 11200        | 11200         | 11200               | 11200           | 71900      | 104300       | 104300      | 104300     | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | N-80  | 11780                         | 11200   | 11200           | 11200        | 11200         | 11200               | 11200           | 71900      | 104300       | 104300      | 104300     | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | C-90  | 13250                         | 12600   | 12600           | 12600        | 12600         | 12600               | 12600           | 80900      | 117400       | 117400      | 117400     | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | T-95  | 13980                         | 13300   | 13300           | 13300        | 13300         | 13300               | 13300           | 85400      | 123900       | 123900      | 123900     | 0.190        | 1.995 | 1.901 |
| 2.375            | 4.60                     | 4.70       | P-110 | 16130                         | 15400   | 15400           | 15400        | 15400         | 15400               | 15400           | 98900      | 143500       | 143500      | 143500     | 0.190        | 1.995 | 1.901 |
| 2.375            | 5.80                     | 5.95       | L-80  | 15280                         | 14970   | 14850           | 14850        | 14850         | 14850               | 14850           | 103000     | 135400       | 135400      | 135400     | 0.254        | 1.867 | 1.773 |
| 2.375            | 5.80                     | 5.95       | N-80  | 15280                         | 14970   | 14850           | 14850        | 14850         | 14850               | 14850           | 103000     | 135400       | 135400      | 135400     | 0.254        | 1.867 | 1.773 |
| 2.375            | 5.80                     | 5.95       | C-90  | 17190                         | 16840   | 16710           | 16710        | 16710         | 16710               | 16710           | 115900     | 152300       | 152300      | 152300     | 0.254        | 1.867 | 1.773 |
| 2.375            | 5.80                     | 5.95       | T-95  | 18150                         | 17780   | 17640           | 17640        | 17640         | 17640               | 17640           | 13570      | 122300       | 160800      | 160800     | 0.254        | 1.867 | 1.773 |
| 2.375            | 5.80                     | 5.95       | P-110 | 21010                         | 20590   | 20590           | 20590        | 20590         | 20590               | 20590           | 141600     | 186200       | 186200      | 186200     | 0.254        | 1.867 | 1.773 |
| 2.875            | 6.40                     | 6.50       | H-40  | 5580                          | 5280  | 5280            | 5280         | 5280          | 5280                | 5280            | 52800      | 72500        | 72500       | 72500      | 0.217        | 2.441 | 2.347 |
| 2.875            | 6.40                     | 6.50       | J-55  | 7680                          | 7260  | 7260            | 7260         | 7260          | 7260                | 7260            | 72600      | 99700        | 99700       | 99700      | 0.217        | 2.441 | 2.347 |

A. Integral joint connection only.

B. Buttress tubing connections are non-API.





## TUBING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size<br>O.D. in. | Nominal Weight<br>lbs/ft |            | Grade | Collapse<br>Resistance | Internal Yield<br>Pressure at Minimum Yield, psi |                 |              |               | Joint Strength, lbs |                 |            | Pipe<br>Body<br>Yield<br>lbs | Wall<br>in. | I.D.<br>in. | Drift<br>in. |
|------------------|--------------------------|------------|-------|------------------------|--|-----------------|--------------|---------------|---------------------|-----------------|------------|------------------------------|-------------|-------------|--------------|
|                  | NUE<br>T&C               | EUE<br>T&C |       |                        | PE,<br>NUE                                       | Buttress<br>T&C | Reg.<br>Cpl. | Spec.<br>Cpl. | NUE<br>T&C          | Buttress<br>T&C | EUE<br>T&C |                              |             |             |              |
| 2.875            | 6.40                     | 6.50       | M-65  | 9070                   | 8590   | 8590            | 8590         | 8590          | 85800               | 117800          | 117800     | 117800                       | 0.217       | 2.441       | 2.347        |
| 2.875            | 6.40                     | 6.50       | L-80  | 11170                  | 10570  | 10570           | 10570        | 10570         | 105600              | 145000          | 145000     | 145000                       | 0.217       | 2.441       | 2.347        |
| 2.875            | 6.40                     | 6.50       | N-80  | 11170                  | 10570  | 10570           | 10570        | 10570         | 105600              | 145000          | 145000     | 145000                       | 0.217       | 2.441       | 2.347        |
| 2.875            | 6.40                     | 6.50       | C-90  | 12380                  | 11890  | 11890           | 11890        | 11890         | 118800              | 163100          | 163100     | 163100                       | 0.217       | 2.441       | 2.347        |
| 2.875            | 6.40                     | 6.50       | T-95  | 12940                  | 12550  | 12550           | 12550        | 12550         | 125400              | 172100          | 172100     | 172100                       | 0.217       | 2.441       | 2.347        |
| 2.875            | 6.40                     | 6.50       | P-110 | 14550                  | 14530  | 14530           | 14530        | 14530         | 145200              | 199300          | 199300     | 199300                       | 0.217       | 2.441       | 2.347        |
| 2.875            | 7.80                     | 7.90       | L-80  | 13890                  | 13440  | 13440           | 13440        | 11040         | 140900              | 180300          | 180300     | 180300                       | 0.276       | 2.323       | 2.229        |
| 2.875            | 7.80                     | 7.90       | N-80  | 13890                  | 13440  | 13440           | 13440        | 11040         | 140900              | 180300          | 180300     | 180300                       | 0.276       | 2.323       | 2.229        |
| 2.875            | 7.80                     | 7.90       | C-90  | 15620                  | 15120  | 15120           | 15120        | 12420         | 158500              | 202800          | 202800     | 202800                       | 0.276       | 2.323       | 2.229        |
| 2.875            | 7.80                     | 7.90       | T-95  | 16490                  | 15960  | 15960           | 15960        | 13110         | 167300              | 214100          | 214100     | 214100                       | 0.276       | 2.323       | 2.229        |
| 2.875            | 7.80                     | 7.90       | P-110 | 19090                  | 18480  | 18480           | 18480        | 15180         | 193700              | 247900          | 247900     | 247900                       | 0.276       | 2.323       | 2.229        |
| 2.875            | 8.60                     | 8.70       | L-80  | 15300                  | 15000  | 15000           | 14950        | 11040         | 159300              | 198700          | 198700     | 198700                       | 0.308       | 2.259       | 2.165        |
| 2.875            | 8.60                     | 8.70       | N-80  | 15300                  | 15000  | 15000           | 14950        | 11040         | 159300              | 198700          | 198700     | 198700                       | 0.308       | 2.259       | 2.165        |
| 2.875            | 8.60                     | 8.70       | C-90  | 17220                  | 16870  | 16870           | 16820        | 12420         | 179200              | 223500          | 223500     | 223500                       | 0.308       | 2.259       | 2.165        |
| 2.875            | 8.60                     | 8.70       | T-95  | 18170                  | 17810  | 17810           | 17750        | 13110         | 189200              | 236000          | 236000     | 236000                       | 0.308       | 2.259       | 2.165        |
| 2.875            | 8.60                     | 8.70       | P-110 | 21040                  | 20620  | 20620           | 20560        | 15180         | 219100              | 273200          | 273200     | 273200                       | 0.308       | 2.259       | 2.165        |
| 3.500            | 7.70                     |            | H-40  | 4630                   | 4320   |                 |              |               | 65100               |                 |            | 89100                        | 0.216       | 3.068       | 2.943        |
| 3.500            | 7.70                     |            | J-55  | 5970                   | 5940   |                 |              |               | 89500               |                 |            | 122600                       | 0.216       | 3.068       | 2.943        |
| 3.500            | 7.70                     |            | L-80  | 7870                   | 8640   |                 |              |               | 130100              |                 |            | 178300                       | 0.216       | 3.068       | 2.943        |
| 3.500            | 7.70                     |            | N-80  | 7870                   | 8640   |                 |              |               | 130100              |                 |            | 178300                       | 0.216       | 3.068       | 2.943        |
| 3.500            | 7.70                     |            | C-90  | 8540                   | 9720   |                 |              |               | 146400              |                 |            | 200600                       | 0.216       | 3.068       | 2.943        |
| 3.500            | 7.70                     |            | T-95  | 8850                   | 10260  |                 |              |               | 154500              |                 |            | 211700                       | 0.216       | 3.068       | 2.943        |
| 3.500            | 9.20                     | 9.30       | H-40  | 5380                   | 5080   | 5080            | 5080         | 5080          | 79500               | 103600          | 103600     | 103600                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | J-55  | 7400                   | 6990   | 6990            | 6990         | 6990          | 109400              | 142500          | 142500     | 142500                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | M-65  | 8750                   | 8260   | 8260            | 8260         | 8260          | 129300              | 168400          | 168400     | 168400                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | L-80  | 10540                  | 10160  | 10160           | 10160        | 10160         | 159100              | 207200          | 207200     | 207200                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | N-80  | 10540                  | 10160  | 10160           | 10160        | 10160         | 159100              | 207200          | 207200     | 207200                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | C-90  | 11570                  | 11430  | 11430           | 11430        | 11430         | 179000              | 233100          | 233100     | 233100                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | T-95  | 12080                  | 12070  | 12070           | 12070        | 12070         | 188900              | 246100          | 246100     | 246100                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 9.20                     | 9.30       | P-110 | 13530                  | 13970  | 13970           | 13970        | 13970         | 218700              | 284900          | 284900     | 284900                       | 0.254       | 2.992       | 2.867        |
| 3.500            | 10.20                    |            | H-40  | 6060                   | 5780   |                 |              |               | 92500               |                 |            | 116600                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 10.20                    |            | J-55  | 8330                   | 7950   |                 |              |               | 127300              |                 |            | 160300                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 10.20                    |            | M-65  | 9850                   | 9390   |                 |              |               | 150400              |                 |            | 189500                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 10.20                    |            | L-80  | 12120                  | 11560  |                 |              |               | 185100              |                 |            | 233200                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 10.20                    |            | N-80  | 12120                  | 11560  |                 |              |               | 185100              |                 |            | 233200                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 10.20                    |            | C-90  | 13640                  | 13010  |                 |              |               | 208200              |                 |            | 262400                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 10.20                    |            | T-95  | 14390                  | 13730  |                 |              |               | 219800              |                 |            | 277000                       | 0.289       | 2.922       | 2.797        |
| 3.500            | 12.70                    | 12.95      | L-80  | 15310                  | 15000  | 15000           | 15000        | 10660         | 246400              | 294500          | 294500     | 294500                       | 0.375       | 2.750       | 2.625        |
| 3.500            | 12.70                    | 12.95      | N-80  | 15310                  | 15000  | 15000           | 15000        | 10660         | 246400              | 294500          | 294500     | 294500                       | 0.375       | 2.750       | 2.625        |
| 3.500            | 12.70                    | 12.95      | C-90  | 17220                  | 16880  | 16880           | 16880        | 11990         | 277200              | 331300          | 331300     | 331300                       | 0.375       | 2.750       | 2.625        |
| 3.500            | 12.70                    | 12.95      | T-95  | 18180                  | 17810  | 17810           | 17810        | 12660         | 292600              | 349700          | 349700     | 349700                       | 0.375       | 2.750       | 2.625        |
| 3.500            | 12.70                    | 12.95      | P-110 | 21050                  | 20630  | 20630           | 20630        | 14650         | 338800              | 405000          | 405000     | 405000                       | 0.375       | 2.750       | 2.625        |
| 4.000            | 9.50                     |            | H-40  | 4050                   | 3960   |                 |              |               | 72000               |                 |            | 107200                       | 0.226       | 3.548       | 3.423        |
| 4.000            | 9.50                     |            | J-55  | 5110                   | 5440   |                 |              |               | 99000               |                 |            | 147400                       | 0.226       | 3.548       | 3.423        |
| 4.000            | 9.50                     |            | L-80  | 6590                   | 7910   |                 |              |               | 144000              |                 |            | 214400                       | 0.226       | 3.548       | 3.423        |
| 4.000            | 9.50                     |            | N-80  | 6590                   | 7910   |                 |              |               | 144000              |                 |            | 214400                       | 0.226       | 3.548       | 3.423        |
| 4.000            | 9.50                     |            | C-90  | 7080                   | 8900   |                 |              |               | 162000              |                 |            | 241200                       | 0.226       | 3.548       | 3.423        |
| 4.000            | 9.50                     |            | T-95  | 97310                  | 9390   |                 |              |               | 171000              |                 |            | 254600                       | 0.226       | 3.548       | 3.423        |
| 4.000            |                          | 11.00      | H-40  | 4900                   | 4590   |                 | 4590         |               |                     |                 | 123100     | 123100                       | 0.262       | 3.476       | 3.351        |
| 4.000            |                          | 11.00      | J-55  | 6590                   | 6300   |                 | 6300         |               |                     |                 | 169200     | 169200                       | 0.262       | 3.476       | 3.351        |
| 4.000            |                          | 11.00      | L-80  | 8800                   | 9170   |                 | 9170         |               |                     |                 | 246100     | 246100                       | 0.262       | 3.476       | 3.351        |
| 4.000            |                          | 11.00      | N-80  | 8800                   | 9170   |                 | 9170         |               |                     |                 | 246100     | 246100                       | 0.262       | 3.476       | 3.351        |
| 4.000            |                          | 11.00      | C-90  | 9590                   | 10320  |                 | 10320        |               |                     |                 | 276900     | 276900                       | 0.262       | 3.476       | 3.351        |
| 4.000            |                          | 11.00      | T-95  | 9980                   | 10890  |                 | 10890        |               |                     |                 | 292300     | 292300                       | 0.262       | 3.476       | 3.351        |
| 4.500            | 12.60                    | 12.75      | H-40  | 4490                   | 4220   |                 | 4220         |               | 104400              |                 |            | 144000                       | 0.271       | 3.958       | 3.833        |
| 4.500            | 12.60                    | 12.75      | J-55  | 5730                   | 5800   |                 | 5800         |               | 143500              |                 |            | 198000                       | 0.271       | 3.958       | 3.833        |
| 4.500            | 12.60                    | 12.75      | L-80  | 7500                   | 8430   |                 | 8430         |               | 208700              |                 |            | 288000                       | 0.271       | 3.958       | 3.833        |
| 4.500            | 12.60                    | 12.75      | N-80  | 7500                   | 8430   |                 | 8430         |               | 208700              |                 |            | 288000                       | 0.271       | 3.958       | 3.833        |
| 4.500            | 12.60                    | 12.75      | C-90  | 8120                   | 9490   |                 | 9490         |               | 234800              |                 |            | 324000                       | 0.271       | 3.958       | 3.833        |
| 4.500            | 12.60                    | 12.75      | T-95  | 8410                   | 10010  |                 | 10010        |               | 247900              |                 |            | 342000                       | 0.271       | 3.958       | 3.833        |

A. Indicates items available from Lone Star Steel  
 B. Buttress tubing connections are non-API



## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size O.D. In. | Nominal Weight T & C lbs/ft | Grade | Collapse Resistance psi | Internal Yield Pressure at Minimum Yield, psi |      |       |       | Joint Strength 1000 lbs |     |     | Body Yield 1000 lbs | Wall In. | I.D. In. | Drift Diameter in. API |
|---------------|-----------------------------|-------|-------------------------|---|------|-------|-------|-------------------------|-----|-----|---------------------|----------|----------|------------------------|
|               |                             |       |                         | PE  | STC  | LTC   | BTC   | STC                     | LTC | BTC |                     |          |          |                        |
| 4.500         | 9.50                        | J-55  | 3310                    | 4380  | 4380 |       |       | 101                     |     |     | 152                 | 0.205    | 4.090    | 3.965                  |
| 4.500         | 9.50                        | K-55  | 3310                    | 4380  | 4380 |       |       | 112                     |     |     | 152                 | 0.205    | 4.090    | 3.965                  |
| 4.500         | 9.50                        | M-65  | 3600                    | 5180  | 5180 |       |       | 135                     |     |     | 180                 | 0.205    | 4.090    | 3.965                  |
| 4.500         | 10.50                       | J-55  | 4010                    | 4790  | 4790 |       | 4790  | 132                     |     | 203 | 166                 | 0.224    | 4.052    | 3.927                  |
| 4.500         | 10.50                       | K-55  | 4010                    | 4790  | 4790 |       | 4790  | 146                     |     | 249 | 166                 | 0.224    | 4.052    | 3.927                  |
| 4.500         | 10.50                       | M-65  | 4420                    | 5660  | 5660 |       | 5660  | 154                     |     | 231 | 195                 | 0.224    | 4.052    | 3.927                  |
| 4.500         | 11.60                       | J-55  | 4960                    | 5350  | 5350 | 5350  | 5350  | 154                     | 162 | 225 | 184                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | K-55  | 4960                    | 5350  | 5350 | 5350  | 5350  | 170                     | 180 | 277 | 184                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | M-65  | 5560                    | 6320  | 6320 | 6320  | 6320  | 179                     | 188 | 256 | 217                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | L-80  | 6350                    | 7780  |      | 7780  | 7780  |                         | 212 | 291 | 267                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | N-80  | 6350                    | 7780  |      | 7780  | 7780  |                         | 223 | 304 | 267                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | C-90  | 6810                    | 8750  |      | 8750  | 8750  |                         | 223 | 309 | 300                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | S-95  | 8650                    | 9240  |      | 9240  | 9240  |                         | 245 | 338 | 317                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | C-95  | 7030                    | 9240  |      | 9240  | 9240  |                         | 234 | 325 | 317                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | T-95  | 7030                    | 9240  |      | 9240  | 9240  |                         | 234 | 325 | 317                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 11.60                       | P-110 | 7580                    | 10690   |      | 10690 | 10690 |                         | 279 | 385 | 367                 | 0.250    | 4.000    | 3.875                  |
| 4.500         | 13.50                       | M-65  | 7300                    | 7330  |      | 7330  | 7330  |                         | 228 | 295 | 249                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 13.50                       | L-80  | 8540                    | 9020  |      | 9020  | 9020  |                         | 257 | 334 | 307                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 13.50                       | N-80  | 8540                    | 9020  |      | 9020  | 9020  |                         | 270 | 349 | 307                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 13.50                       | C-90  | 9300                    | 10150   |      | 10150 | 10150 |                         | 270 | 355 | 345                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 13.50                       | C-95  | 9660                    | 10710   |      | 10710 | 10710 |                         | 284 | 374 | 364                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 13.50                       | T-95  | 9660                    | 10710   |      | 10710 | 10710 |                         | 284 | 374 | 364                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 13.50                       | P-110 | 10680                   | 12410   |      | 12410 | 12410 |                         | 338 | 443 | 422                 | 0.290    | 3.920    | 3.795                  |
| 4.500         | 15.10                       | L-80  | 11090                   | 10480   |      | 10480 | 10480 |                         | 308 | 384 | 353                 | 0.337    | 3.826    | 3.701                  |
| 4.500         | 15.10                       | P-110 | 14350                   | 14420   |      | 14420 | 13460 |                         | 406 | 509 | 485                 | 0.337    | 3.826    | 3.701                  |
| 4.500         | 15.10                       | Q-125 | 15840                   | 16380   |      | 16380 | 15300 |                         | 438 | 554 | 551                 | 0.337    | 3.826    | 3.701                  |
| 5.000         | 11.50                       | J-55  | 3060                    | 4240  | 4240 |       |       | 133                     |     |     | 182                 | 0.220    | 4.560    | 4.435                  |
| 5.000         | 11.50                       | K-55  | 3060                    | 4240  | 4240 |       |       | 147                     |     |     | 182                 | 0.220    | 4.560    | 4.435                  |
| 5.000         | 11.50                       | M-65  | 3290                    | 5010  | 5010 |       |       | 162                     |     |     | 215                 | 0.220    | 4.560    | 4.435                  |
| 5.000         | 13.00                       | J-55  | 4140                    | 4870  | 4870 | 4870  | 4870  | 169                     | 182 | 252 | 208                 | 0.253    | 4.494    | 4.369                  |
| 5.000         | 13.00                       | K-55  | 4140                    | 4870  | 4870 | 4870  | 4870  | 186                     | 201 | 309 | 208                 | 0.253    | 4.494    | 4.369                  |
| 5.000         | 13.00                       | M-65  | 4590                    | 5760  | 5760 | 5760  | 5760  | 196                     | 212 | 288 | 245                 | 0.253    | 4.494    | 4.369                  |
| 5.000         | 15.00                       | J-55  | 5560                    | 5700  | 5700 | 5700  | 5700  | 207                     | 223 | 293 | 241                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | K-55  | 5560                    | 5700  | 5700 | 5700  | 5700  | 228                     | 246 | 359 | 241                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | M-65  | 6280                    | 6730  | 6730 | 6730  | 6730  | 240                     | 259 | 334 | 284                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | L-80  | 7250                    | 8290  |      | 8290  | 8290  |                         | 295 | 379 | 350                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | N-80  | 7250                    | 8290  |      | 8290  | 8290  |                         | 311 | 396 | 350                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | C-90  | 7840                    | 9320  |      | 9320  | 9320  |                         | 311 | 404 | 394                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | C-95  | 8110                    | 9840  |      | 9840  | 9840  |                         | 326 | 424 | 416                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | T-95  | 8110                    | 9840  |      | 9840  | 9840  |                         | 326 | 424 | 416                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 15.00                       | P-110 | 8850                    | 11400   |      | 11400 | 11400 |                         | 388 | 503 | 481                 | 0.296    | 4.408    | 4.283                  |
| 5.000         | 18.00                       | M-65  | 8730                    | 8240  |      | 8240  | 8240  |                         | 331 | 403 | 343                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | L-80  | 10500                   | 10140   |      | 10140 | 9910  |                         | 377 | 457 | 422                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | N-80  | 10500                   | 10140   |      | 10140 | 9910  |                         | 396 | 477 | 422                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | C-90  | 11530                   | 11400   |      | 11400 | 11150 |                         | 396 | 484 | 475                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | C-95  | 12030                   | 12040   |      | 12040 | 11770 |                         | 416 | 512 | 501                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | T-95  | 12030                   | 12040   |      | 12040 | 11770 |                         | 416 | 512 | 501                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | P-110 | 13470                   | 13940   |      | 13940 | 13620 |                         | 495 | 606 | 580                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 18.00                       | Q-125 | 14830                   | 15840   |      | 15840 | 15480 |                         | 535 | 661 | 659                 | 0.362    | 4.276    | 4.151                  |
| 5.000         | 21.40                       | L-80  | 12760                   | 12240   |      | 10810 | 9910  |                         | 466 | 510 | 501                 | 0.437    | 4.126    | 4.001                  |
| 5.000         | 21.40                       | N-80  | 12760                   | 12240   |      | 10810 | 9910  |                         | 490 | 537 | 501                 | 0.437    | 4.126    | 4.001                  |
| 5.000         | 21.40                       | C-90  | 14360                   | 13770   |      | 12170 | 11150 |                         | 490 | 537 | 564                 | 0.437    | 4.126    | 4.001                  |
| 5.000         | 21.40                       | C-95  | 15160                   | 14530   |      | 12840 | 11770 |                         | 515 | 563 | 595                 | 0.437    | 4.126    | 4.001                  |
| 5.000         | 21.40                       | T-95  | 15160                   | 14530   |      | 12840 | 11770 |                         | 515 | 563 | 595                 | 0.437    | 4.126    | 4.001                  |





## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size<br>O.D.<br>In. | Nominal<br>Weight<br>T & C lbs/ft | Grade | Collapse<br>Resistance<br>psi | Internal Yield Pressure<br>at Minimum Yield, psi |      |       |       | Joint Strength<br>1000 lbs |     |     | Body<br>Yield<br>1000<br>lbs | Wall<br>In. | I.D.<br>In. | Drift<br>Diameter in.<br>API |
|---------------------|-----------------------------------|-------|-------------------------------|--|------|-------|-------|----------------------------|-----|-----|------------------------------|-------------|-------------|------------------------------|
|                     |                                   |       |                               | PE   | STC  | LTC   | BTC   | STC                        | LTC | BTC |                              |             |             |                              |
| 5.000               | 21.40                             | P-110 | 17550                         | 16820  |      | 14870 | 13620 |                            | 613 | 671 | 689                          | 0.437       | 4.126       | 4.001                        |
| 5.000               | 21.40                             | Q-125 | 19940                         | 19120  |      | 16900 | 15480 |                            | 662 | 724 | 783                          | 0.437       | 4.126       | 4.001                        |
| 5.000               | 23.20                             | L-80  | 13830                         | 13380  |      | 10810 | 9910  |                            | 513 | 510 | 543                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 23.20                             | N-80  | 13830                         | 13380  |      | 10810 | 9910  |                            | 540 | 537 | 543                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 23.20                             | C-90  | 15560                         | 15060  |      | 12170 | 11150 |                            | 540 | 537 | 611                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 23.20                             | C-95  | 16430                         | 15890  |      | 12840 | 11770 |                            | 567 | 563 | 645                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 23.20                             | T-95  | 16430                         | 15890  |      | 12840 | 11770 |                            | 567 | 563 | 645                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 23.20                             | P-110 | 19020                         | 18400  |      | 14780 | 13626 |                            | 675 | 671 | 747                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 23.20                             | Q-125 | 21620                         | 20910  |      | 16900 | 15480 |                            | 729 | 724 | 849                          | 0.478       | 4.044       | 3.919                        |
| 5.000               | 24.10                             | L-80  | 14400                         | 14000  |      | 10810 | 9910  |                            | 538 | 510 | 566                          | 0.500       | 4.000       | 3.875                        |
| 5.000               | 24.10                             | N-80  | 14400                         | 14000  |      | 10810 | 9910  |                            | 558 | 537 | 566                          | 0.500       | 4.000       | 3.875                        |
| 5.000               | 24.10                             | C-90  | 16200                         | 15750  |      | 12170 | 11150 |                            | 567 | 537 | 636                          | 0.500       | 4.000       | 3.875                        |
| 5.000               | 24.10                             | C-95  | 17100                         | 16630  |      | 12840 | 11770 |                            | 595 | 563 | 672                          | 0.500       | 4.000       | 3.875                        |
| 5.000               | 24.10                             | T-95  | 17100                         | 16630  |      | 12840 | 11770 |                            | 595 | 563 | 672                          | 0.500       | 4.000       | 3.875                        |
| 5.000               | 24.10                             | P-110 | 19800                         | 19250  |      | 14870 | 13620 |                            | 708 | 671 | 778                          | 0.500       | 4.000       | 3.875                        |
| 5.000               | 24.10                             | Q-125 | 22500                         | 21880  |      | 16900 | 15480 |                            | 765 | 724 | 884                          | 0.500       | 4.000       | 3.875                        |
| 5.500               | 14.00                             | J-55  | 3120                          | 4270   | 4270 |       |       |                            | 172 |     | 222                          | 0.244       | 5.012       | 4.887                        |
| 5.500               | 14.00                             | K-55  | 3120                          | 4270   | 4270 |       |       |                            | 189 |     | 222                          | 0.244       | 5.012       | 4.887                        |
| 5.500               | 14.00                             | M-65  | 3360                          | 5050   | 5050 |       |       |                            | 200 |     | 262                          | 0.244       | 5.012       | 4.887                        |
| 5.500               | 15.50                             | J-55  | 4040                          | 4810   | 4810 | 4810  | 4810  | 202                        | 217 | 300 | 248                          | 0.275       | 4.950       | 4.825                        |
| 5.500               | 15.50                             | K-55  | 4040                          | 4810   | 4810 | 4810  | 4810  | 222                        | 239 | 366 | 248                          | 0.275       | 4.950       | 4.825                        |
| 5.500               | 15.50                             | M-65  | 4470                          | 5690   | 5690 | 5690  | 5690  | 235                        | 253 | 342 | 293                          | 0.275       | 4.950       | 4.825                        |
| 5.500               | 17.00                             | J-55  | 4910                          | 5320   | 5320 | 5320  | 5320  | 229                        | 247 | 329 | 273                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | K-55  | 4910                          | 5320   | 5320 | 5320  | 5320  | 252                        | 272 | 402 | 273                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | M-65  | 5510                          | 6290   | 6290 | 6290  | 6290  | 267                        | 287 | 376 | 323                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | L-80  | 6290                          | 7740   |      | 7740  | 7740  |                            | 338 | 428 | 397                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | N-80  | 6290                          | 7740   |      | 7740  | 7740  |                            | 348 | 446 | 397                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | C-90  | 6740                          | 8710   |      | 8710  | 8710  |                            | 356 | 456 | 447                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | T-95  | 6940                          | 9190   |      | 9190  | 9190  |                            | 374 | 480 | 471                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | C-95  | 6940                          | 9190   |      | 9190  | 9190  |                            | 374 | 480 | 471                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | P-110 | 7480                          | 10640  |      | 10640 | 10640 |                            | 445 | 568 | 546                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 17.00                             | Q-125 | 7890                          | 12090  |      | 12090 | 12090 |                            | 481 | 620 | 620                          | 0.304       | 4.892       | 4.767                        |
| 5.500               | 20.00                             | M-65  | 7540                          | 7470   |      | 7470  | 7470  |                            | 353 | 442 | 379                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | L-80  | 8830                          | 9190   |      | 9190  | 8990  |                            | 416 | 503 | 466                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | N-80  | 8830                          | 9190   |      | 9190  | 8990  |                            | 428 | 524 | 466                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | C-90  | 9630                          | 10340  |      | 10340 | 10120 |                            | 438 | 436 | 525                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | T-95  | 10010                         | 10910  |      | 10910 | 10680 |                            | 460 | 563 | 554                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | C-95  | 10010                         | 10910  |      | 10910 | 10680 |                            | 460 | 563 | 554                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | P-110 | 11100                         | 12630  |      | 12630 | 12360 |                            | 548 | 667 | 641                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 20.00                             | Q-125 | 12080                         | 14360  |      | 14360 | 14050 |                            | 592 | 728 | 729                          | 0.361       | 4.778       | 4.653                        |
| 5.500               | 23.00                             | L-80  | 11160                         | 10560  |      | 9880  | 8990  |                            | 489 | 550 | 530                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 23.00                             | N-80  | 11160                         | 10560  |      | 9880  | 8990  |                            | 502 | 579 | 530                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 23.00                             | C-90  | 12380                         | 11880  |      | 11110 | 10120 |                            | 514 | 579 | 597                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 23.00                             | T-95  | 12940                         | 12540  |      | 11730 | 10680 |                            | 540 | 608 | 630                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 23.00                             | C-95  | 12940                         | 12540  |      | 11730 | 10680 |                            | 540 | 608 | 630                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 23.00                             | P-110 | 14540                         | 14530  |      | 13580 | 12360 |                            | 643 | 724 | 729                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 23.00                             | Q-125 | 16070                         | 16510  |      | 15430 | 14050 |                            | 694 | 782 | 829                          | 0.415       | 4.670       | 4.545                        |
| 5.500               | 26.00                             | C-90  | 14240                         | 13630  |      | 11110 | 10120 |                            | 598 | 579 | 676                          | 0.476       | 4.548       | 4.423                        |
| 5.500               | 26.00                             | C-95  | 15030                         | 14390  |      | 11730 | 10680 |                            | 628 | 608 | 714                          | 0.476       | 4.548       | 4.423                        |
| 5.500               | 26.00                             | T-95  | 15030                         | 14390  |      | 11730 | 10680 |                            | 628 | 608 | 714                          | 0.476       | 4.548       | 4.423                        |
| 5.500               | 26.00                             | P-110 | 17400                         | 16660  |      | 13580 | 12360 |                            | 748 | 724 | 826                          | 0.476       | 4.548       | 4.423                        |
| 5.500               | 26.00                             | Q-125 | 19770                         | 18930  |      | 15430 | 14050 |                            | 808 | 782 | 939                          | 0.476       | 4.548       | 4.423                        |



## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size<br>O.D.<br>In. | Nominal<br>Weight<br>T & C<br>lbs/ft | Grade | Collapse<br>Resistance<br>psi | Internal Yield Pressure<br>at Minimum Yield, psi |       |      |       | Joint Strength<br>1000 lbs |     |     | Body<br>Yield | Wall<br>In. | I.D.<br>In. | Drift<br>Diameter in.<br>API |       |       |
|---------------------|--------------------------------------|-------|-------------------------------|--|-------|------|-------|----------------------------|-----|-----|---------------|-------------|-------------|------------------------------|-------|-------|
|                     |                                      |       |                               | PE   | STC   | LTC  | BTC   | STC                        | LTC | BTC |               |             |             |                              |       |       |
| 5.500               | 26.80                                | C-90  | 14880                         | 14320  |       |      |       |                            |     |     | 707           | 0.500       | 4.500       | 4.375                        |       |       |
| 5.500               | 26.80                                | T-95  | 15700                         | 15110  |       |      |       |                            |     |     | 746           | 0.500       | 4.500       | 4.375                        |       |       |
| 5.500               | 29.70                                | C-90  | 16510                         | 16090  |       |      |       |                            |     |     | 785           | 0.562       | 4.376       | 4.251                        |       |       |
| 5.500               | 29.70                                | T-95  | 17430                         | 16990  |       |      |       |                            |     |     | 828           | 0.562       | 4.376       | 4.251                        |       |       |
| 5.500               | 32.60                                | C-90  | 18130                         | 17900  |       |      |       |                            |     |     | 861           | 0.625       | 4.250       | 4.125                        |       |       |
| 5.500               | 32.60                                | T-95  | 19140                         | 18810  |       |      |       |                            |     |     | 909           | 0.625       | 4.250       | 4.125                        |       |       |
| 5.500               | 35.30                                | C-90  | 19680                         | 19670  |       |      |       |                            |     |     | 935           | 0.687       | 4.126       | 4.001                        |       |       |
| 5.500               | 35.30                                | T-95  | 20760                         | 20770  |       |      |       |                            |     |     | 987           | 0.687       | 4.126       | 4.001                        |       |       |
| 5.500               | 38.00                                | C-90  | 21200                         | 21480  |       |      |       |                            |     |     | 1007          | 0.750       | 4.000       | 3.875                        |       |       |
| 5.500               | 38.00                                | T-95  | 22380                         | 22670  |       |      |       |                            |     |     | 1063          | 0.750       | 4.000       | 3.875                        |       |       |
| 5.500               | 40.50                                | C-90  | 22650                         | 23250  |       |      |       |                            |     |     | 1076          | 0.812       | 3.876       | 3.751                        |       |       |
| 5.500               | 40.50                                | T-95  | 23920                         | 24540  |       |      |       |                            |     |     | 1136          | 0.812       | 3.876       | 3.751                        |       |       |
| 5.500               | 43.10                                | C-90  | 24080                         | 25060  |       |      |       |                            |     |     | 1144          | 0.875       | 3.750       | 3.625                        |       |       |
| 5.500               | 43.10                                | T-95  | 25400                         | 26450  |       |      |       |                            |     |     | 1208          | 0.875       | 3.750       | 3.625                        |       |       |
| 6.625               | 20.00                                | H-40  | 2520                          | 3040   |       |      |       |                            | 184 |     |               |             | 229         | 0.288                        | 6.049 | 5.924 |
| 6.625               | 20.00                                | J-55  | 2970                          | 4180   | 4180  | 4180 | 4180  | 245                        | 266 | 374 | 315           | 0.288       | 6.049       | 5.924                        |       |       |
| 6.625               | 20.00                                | K-55  | 2970                          | 4180   | 4180  | 4180 | 4180  | 267                        | 290 | 453 | 315           | 0.288       | 6.049       | 5.924                        |       |       |
| 6.625               | 20.00                                | M-65  | 3190                          | 4940   | 4940  | 4940 | 4940  | 285                        | 309 | 428 | 373           | 0.288       | 6.049       | 5.924                        |       |       |
| 6.625               | 24.00                                | J-55  | 4560                          | 5110   | 5110  | 5110 | 5110  | 314                        | 340 | 453 | 382           | 0.352       | 5.921       | 5.796                        |       |       |
| 6.625               | 24.00                                | K-55  | 4560                          | 5110   | 5110  | 5110 | 5110  | 342                        | 372 | 548 | 382           | 0.352       | 5.921       | 5.796                        |       |       |
| 6.625               | 24.00                                | M-65  | 5080                          | 6040   | 6040  | 6040 | 6040  | 366                        | 397 | 518 | 451           | 0.352       | 5.921       | 5.796                        |       |       |
| 6.625               | 24.00                                | L-80  | 5760                          | 7440   | 7440  |      | 7440  | 473                        |     |     | 592           | 555         | 0.352       | 5.921                        | 5.796 |       |
| 6.625               | 24.00                                | N-80  | 5760                          | 7440   | 7440  |      | 7440  | 481                        |     |     | 615           | 555         | 0.352       | 5.921                        | 5.796 |       |
| 6.625               | 24.00                                | C-90  | 6140                          | 8370   | 8370  |      | 8370  | 520                        |     |     | 633           | 624         | 0.352       | 5.921                        | 5.796 |       |
| 6.625               | 24.00                                | C-95  | 6310                          | 8830   | 8830  |      | 8830  | 546                        |     |     | 665           | 659         | 0.352       | 5.921                        | 5.796 |       |
| 6.625               | 24.00                                | P-110 | 6730                          | 10230  | 10230 |      | 10230 | 641                        |     |     | 786           | 763         | 0.352       | 5.921                        | 5.796 |       |
| 6.625               | 28.00                                | M-65  | 7010                          | 7160   | 7160  | 7160 | 7160  | 483                        | 607 | 529 | 529           | 0.417       | 5.791       | 5.666                        |       |       |
| 6.625               | 28.00                                | L-80  | 8170                          | 8810   | 8810  |      | 8810  | 576                        |     |     | 693           | 651         | 0.417       | 5.791                        | 5.666 |       |
| 6.625               | 28.00                                | N-80  | 8170                          | 8810   | 8810  |      | 8810  | 586                        |     |     | 721           | 651         | 0.417       | 5.791                        | 5.666 |       |
| 6.625               | 28.00                                | C-90  | 8880                          | 9910   | 9910  |      | 9910  | 633                        |     |     | 742           | 732         | 0.417       | 5.791                        | 5.666 |       |
| 6.625               | 28.00                                | C-95  | 9220                          | 10460  | 10460 |      | 10460 | 665                        |     |     | 780           | 773         | 0.417       | 5.791                        | 5.666 |       |
| 6.625               | 28.00                                | P-110 | 10160                         | 12120  | 12120 |      | 12120 | 781                        |     |     | 922           | 895         | 0.417       | 5.791                        | 5.666 |       |
| 6.625               | 32.00                                | L-80  | 10320                         | 10040  | 10040 |      | 9820  | 666                        |     |     | 783           | 734         | 0.475       | 5.675                        | 5.550 |       |
| 6.625               | 32.00                                | N-80  | 10320                         | 10040  | 10040 |      | 9820  | 677                        |     |     | 814           | 734         | 0.475       | 5.675                        | 5.550 |       |
| 6.625               | 32.00                                | C-90  | 11330                         | 11290  | 11290 |      | 11050 | 732                        |     |     | 837           | 826         | 0.475       | 5.675                        | 5.550 |       |
| 6.625               | 32.00                                | C-95  | 11810                         | 11920  | 11920 |      | 11660 | 769                        |     |     | 880           | 872         | 0.475       | 5.675                        | 5.550 |       |
| 6.625               | 32.00                                | P-110 | 13220                         | 13800  | 13800 |      | 13500 | 904                        |     |     | 1040          | 1009        | 0.475       | 5.675                        | 5.550 |       |
| 6.625               | 32.00                                | Q-125 | 14530                         | 15680  | 15680 |      | 15340 | 989                        |     |     | 1138          | 1147        | 0.475       | 5.675                        | 5.550 |       |
| 7.000               | 20.00                                | H-40  | 1970                          | 2720   | 2720  |      |       | 176                        |     |     |               | 230         | 0.272       | 6.456                        | 6.331 |       |
| 7.000               | 20.00                                | J-55  | 2270                          | 3740   | 3740  | 3740 | 3740  | 234                        | 257 | 373 | 316           | 0.272       | 6.456       | 6.331                        |       |       |
| 7.000               | 20.00                                | K-55  | 2270                          | 3740   | 3740  | 3740 | 3740  | 254                        | 281 | 451 | 316           | 0.272       | 6.456       | 6.331                        |       |       |
| 7.000               | 20.00                                | M-65  | 2480                          | 4420   | 4420  | 4420 | 4420  | 272                        | 300 | 427 | 374           | 0.272       | 6.456       | 6.331                        |       |       |
| 7.000               | 23.00                                | J-55  | 3270                          | 4360   | 4360  | 4360 | 4360  | 284                        | 313 | 432 | 366           | 0.317       | 6.366       | 6.241                        |       |       |
| 7.000               | 23.00                                | K-55  | 3270                          | 4360   | 4360  | 4360 | 4360  | 309                        | 341 | 522 | 366           | 0.317       | 6.366       | 6.241                        |       |       |
| 7.000               | 23.00                                | M-65  | 3540                          | 5150   | 5150  | 5150 | 5150  | 331                        | 364 | 494 | 433           | 0.317       | 6.366       | 6.241                        |       |       |
| 7.000               | 23.00                                | L-80  | 3830                          | 6340   | 6340  |      | 6340  | 435                        |     |     | 565           | 532         | 0.317       | 6.366                        | 6.241 |       |
| 7.000               | 23.00                                | N-80  | 3830                          | 6340   | 6340  |      | 6340  | 442                        |     |     | 588           | 532         | 0.317       | 6.366                        | 6.241 |       |
| 7.000               | 23.00                                | C-90  | 4030                          | 7130   | 7130  |      | 7130  | 479                        |     |     | 605           | 599         | 0.317       | 6.366                        | 6.241 |       |
| 7.000               | 23.00                                | T-95  | 4140                          | 7530   | 7530  |      | 7530  | 505                        |     |     | 636           | 632         | 0.317       | 6.366                        | 6.241 |       |
| 7.000               | 23.00                                | C-95  | 4140                          | 7530   | 7530  |      | 7530  | 505                        |     |     | 636           | 632         | 0.317       | 6.366                        | 6.241 |       |
| 7.000               | 26.00                                | J-55  | 4320                          | 4980   | 4980  | 4980 | 4980  | 334                        | 367 | 490 | 415           | 0.362       | 6.276       | 6.151                        |       |       |
| 7.000               | 26.00                                | K-55  | 4320                          | 4980   | 4980  | 4980 | 4980  | 364                        | 401 | 592 | 415           | 0.362       | 6.276       | 6.151                        |       |       |
| 7.000               | 26.00                                | M-65  | 4800                          | 5880   | 5880  | 5880 | 5880  | 389                        | 428 | 561 | 491           | 0.362       | 6.276       | 6.151                        |       |       |
| 7.000               | 26.00                                | L-80  | 5410                          | 7240   | 7240  |      | 7240  | 511                        |     |     | 641           | 604         | 0.362       | 6.276                        | 6.151 |       |
| 7.000               | 26.00                                | N-80  | 5410                          | 7240   | 7240  |      | 7240  | 519                        |     |     | 667           | 604         | 0.362       | 6.276                        | 6.151 |       |
| 7.000               | 26.00                                | C-90  | 5740                          | 8140   | 8140  |      | 8140  | 563                        |     |     | 687           | 679         | 0.362       | 6.276                        | 6.151 |       |
| 7.000               | 26.00                                | S-95  | 7800                          | 8600   | 8600  |      | 8600  | 602                        |     |     | 747           | 717         | 0.362       | 6.276                        | 6.151 |       |
| 7.000               | 26.00                                | C-95  | 5880                          | 8600   | 8600  |      | 8600  | 593                        |     |     | 722           | 717         | 0.362       | 6.276                        | 6.151 |       |





## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size O.D. In. | Nominal Weight T & C lbs/ft | Grade | Collapse Resistance psi | Internal Yield Pressure at Minimum Yield, psi |       |       |      | Joint Strength 1000 lbs |      |       | Body Yield 1000 lbs | Wall In. | I.D. In. | Drift Diamete API |
|---------------|-----------------------------|-------|-------------------------|---|-------|-------|------|-------------------------|------|-------|---------------------|----------|----------|-------------------|
|               |                             |       |                         | PE  | STC   | LTC   | BTC  | STC                     | LTC  | BTC   |                     |          |          |                   |
| 7.000         | 26.00                       | T-95  | 5880                    | 8600  | 8600  | 8600  | 593  | 722                     | 717  | 0.362 | 6.276               | 6.151    |          |                   |
| 7.000         | 26.00                       | P-110 | 6230                    | 9950  | 9950  | 9950  | 693  | 853                     | 830  | 0.362 | 6.276               | 6.151    |          |                   |
| 7.000         | 29.00                       | M-65  | 6090                    | 6630  | 6630  | 6630  | 492  | 628                     | 549  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | L-80  | 7020                    | 8160  | 8160  | 8160  | 587  | 718                     | 676  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | N-80  | 7020                    | 8160  | 8160  | 8160  | 597  | 746                     | 676  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | C-90  | 7580                    | 9180  | 9180  | 9180  | 648  | 768                     | 760  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | C-95  | 7830                    | 9690  | 9690  | 9690  | 683  | 808                     | 803  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | T-95  | 7830                    | 9690  | 9690  | 9690  | 683  | 808                     | 803  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | P-110 | 8530                    | 11220   | 11220 | 11220 | 797  | 955                     | 929  | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 29.00                       | Q-125 | 9100                    | 12750   | 12750 | 12750 | 885  | 1045                    | 1056 | 0.408 | 6.184               | 6.059    |          |                   |
| 7.000         | 32.00                       | L-80  | 8610                    | 9060  | 9060  | 8460  | 661  | 791                     | 745  | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 32.00                       | N-80  | 8610                    | 9060  | 9060  | 8460  | 672  | 823                     | 745  | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 32.00                       | C-90  | 9380                    | 10190   | 10190 | 9520  | 729  | 847                     | 839  | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 32.00                       | C-95  | 9750                    | 10760   | 10760 | 10050 | 768  | 891                     | 885  | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 32.00                       | T-95  | 9750                    | 10760   | 10760 | 10050 | 768  | 891                     | 885  | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 32.00                       | P-110 | 10780                   | 12460   | 12460 | 11640 | 897  | 1053                    | 1025 | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 32.00                       | Q-125 | 11720                   | 14160   | 14160 | 13220 | 996  | 1152                    | 1165 | 0.453 | 6.094               | 5.969    |          |                   |
| 7.000         | 35.00                       | L-80  | 10180                   | 9960  | 9240  | 8460  | 734  | 833                     | 814  | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 35.00                       | N-80  | 10180                   | 9960  | 9240  | 8460  | 746  | 876                     | 814  | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 35.00                       | C-90  | 11170                   | 11210   | 10390 | 9520  | 809  | 876                     | 915  | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 35.00                       | C-95  | 11650                   | 11830   | 10970 | 10050 | 853  | 920                     | 966  | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 35.00                       | T-95  | 11650                   | 11830   | 10970 | 10050 | 853  | 920                     | 966  | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 35.00                       | P-110 | 13020                   | 13700   | 12700 | 11640 | 996  | 1096                    | 1119 | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 35.00                       | Q-125 | 14310                   | 15560   | 14430 | 13220 | 1106 | 1183                    | 1272 | 0.498 | 6.004               | 5.879    |          |                   |
| 7.000         | 38.00                       | L-80  | 11390                   | 10800   | 9240  | 8460  | 801  | 832                     | 877  | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 38.00                       | N-80  | 11390                   | 10800   | 9240  | 8460  | 814  | 876                     | 877  | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 38.00                       | C-90  | 12820                   | 12150   | 10390 | 9520  | 883  | 876                     | 986  | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 38.00                       | C-95  | 13440                   | 12830   | 10970 | 10050 | 931  | 920                     | 1041 | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 38.00                       | T-95  | 13440                   | 12830   | 10970 | 10050 | 931  | 920                     | 1041 | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 38.00                       | P-110 | 15140                   | 14850   | 12700 | 11640 | 1087 | 1096                    | 1205 | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 38.00                       | Q-125 | 16750                   | 16880   | 14430 | 13220 | 1207 | 1183                    | 1370 | 0.540 | 5.920               | 5.795    |          |                   |
| 7.000         | 41.00                       | C-90  | 13900                   | 13280   | 10390 | 9520  | 903  | 876                     | 1069 | 0.590 | 5.820               | 5.695    |          |                   |
| 7.000         | 41.00                       | P-110 | 16990                   | 16230   | 12700 | 11640 | 1111 | 1096                    | 1307 | 0.590 | 5.820               | 5.695    |          |                   |
| 7.000         | 41.00                       | Q-125 | 19300                   | 18440   | 14430 | 13220 | 1244 | 1183                    | 1485 | 0.590 | 5.820               | 5.695    |          |                   |
| 7.000         | 42.70                       | C-90  | 14640                   | 14060   |       |       |      |                         | 1127 | 0.625 | 5.750               | 5.625    |          |                   |
| 7.000         | 42.70                       | T-95  | 15450                   | 14840   |       |       |      |                         | 1189 | 0.625 | 5.750               | 5.625    |          |                   |
| 7.000         | 46.40                       | C-90  | 15930                   | 15460   |       |       |      |                         | 1226 | 0.687 | 5.626               | 5.500    |          |                   |
| 7.000         | 46.40                       | T-95  | 16820                   | 16320   |       |       |      |                         | 1294 | 0.687 | 5.626               | 5.500    |          |                   |
| 7.000         | 50.10                       | C-90  | 17220                   | 16880   |       |       |      |                         | 1325 | 0.750 | 5.500               | 5.375    |          |                   |
| 7.000         | 50.10                       | T-95  | 18810                   | 17810   |       |       |      |                         | 1399 | 0.750 | 5.500               | 5.375    |          |                   |
| 7.000         | 53.60                       | C-90  | 18460                   | 18270   |       |       |      |                         | 1421 | 0.812 | 5.376               | 5.251    |          |                   |
| 7.000         | 53.60                       | T-95  | 19480                   | 19290   |       |       |      |                         | 1500 | 0.812 | 5.376               | 5.251    |          |                   |
| 7.000         | 57.10                       | C-90  | 19690                   | 19690   |       |       |      |                         | 1515 | 0.875 | 5.250               | 5.125    |          |                   |
| 7.000         | 57.10                       | T-95  | 20780                   | 20780   |       |       |      |                         | 1600 | 0.875 | 5.250               | 5.125    |          |                   |
| 7.625         | 24.00                       | H-40  | 2030                    | 2750  | 2750  |       | 212  |                         | 276  | 0.300 | 7.025               | 6.900    |          |                   |
| 7.625         | 26.40                       | J-55  | 2890                    | 4140  | 4140  | 4140  | 4140 | 315                     | 346  | 483   | 0.328               | 6.969    | 6.844    |                   |
| 7.625         | 26.40                       | K-55  | 2890                    | 4140  | 4140  | 4140  | 4140 | 342                     | 377  | 581   | 0.328               | 6.969    | 6.844    |                   |
| 7.625         | 26.40                       | L-80  | 3400                    | 6020  | 6020  | 6020  |      | 482                     | 635  | 602   | 0.328               | 6.969    | 6.844    |                   |
| 7.625         | 26.40                       | N-80  | 3400                    | 6020  | 6020  | 6020  |      | 490                     | 659  | 602   | 0.328               | 6.969    | 6.844    |                   |
| 7.625         | 26.40                       | C-90  | 3610                    | 6780  | 6780  | 6780  |      | 532                     | 681  | 677   | 0.328               | 6.969    | 6.844    |                   |
| 7.625         | 26.40                       | C-95  | 3710                    | 7150  | 7150  | 7150  |      | 560                     | 716  | 714   | 0.328               | 6.969    | 6.844    |                   |
| 7.625         | 26.40                       | T-95  | 3710                    | 7150  | 7150  | 7150  |      | 560                     | 716  | 714   | 0.328               | 6.969    | 6.844    |                   |



## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size O.D. In. | Nominal Weight T & C lbs/ft | Grade | Collapse Resistance psi | Internal Yield Pressure at Minimum Yield, psi |      |       |       | Joint Strength 1000 lbs |      |      | Body Yield 1000 lbs | Wall In. | I.D. In. | Drift Diamete API |
|---------------|-----------------------------|-------|-------------------------|---|------|-------|-------|-------------------------|------|------|---------------------|----------|----------|-------------------|
|               |                             |       |                         | PE  | STC  | LTC   | BTC   | STC                     | LTC  | BTC  |                     |          |          |                   |
| 7.625         | 26.40                       | P-110 | 3920                    | 8280  |      | 8280  | 8280  |                         | 654  | 845  | 827                 | 0.328    | 6.969    | 6.844             |
| 7.625         | 29.70                       | M-65  | 4310                    | 5590  |      | 5590  | 5590  |                         | 474  | 629  | 555                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 29.70                       | L-80  | 4790                    | 6890  |      | 6890  | 6890  |                         | 566  | 721  | 683                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 29.70                       | N-80  | 4790                    | 6890  |      | 6890  | 6890  |                         | 575  | 749  | 683                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 29.70                       | C-90  | 5040                    | 7750  |      | 7750  | 7750  |                         | 625  | 773  | 769                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 29.70                       | C-95  | 5140                    | 8180  |      | 8180  | 8180  |                         | 659  | 813  | 811                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 29.70                       | T-95  | 5140                    | 8180  |      | 8180  | 8180  |                         | 659  | 813  | 811                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 29.70                       | P-110 | 5350                    | 9470  |      | 9470  | 9470  |                         | 769  | 960  | 940                 | 0.375    | 6.875    | 6.750             |
| 7.625         | 33.70                       | L-80  | 6560                    | 7900  |      | 7900  | 7900  |                         | 664  | 820  | 778                 | 0.430    | 6.765    | 6.640             |
| 7.625         | 33.70                       | N-80  | 6560                    | 7900  |      | 7900  | 7900  |                         | 674  | 852  | 778                 | 0.430    | 6.765    | 6.640             |
| 7.625         | 33.70                       | C-90  | 7050                    | 8880  |      | 8880  | 8880  |                         | 733  | 880  | 875                 | 0.430    | 6.765    | 6.640             |
| 7.625         | 33.70                       | C-95  | 7280                    | 9380  |      | 9380  | 9380  |                         | 772  | 925  | 923                 | 0.430    | 6.765    | 6.640             |
| 7.625         | 33.70                       | T-95  | 7280                    | 9380  |      | 9380  | 9380  |                         | 772  | 925  | 923                 | 0.430    | 6.765    | 6.640             |
| 7.625         | 33.70                       | P-110 | 7870                    | 10860   |      | 10860 | 10860 |                         | 901  | 1093 | 1069                | 0.430    | 6.765    | 6.640             |
| 7.625         | 33.70                       | Q-125 | 8350                    | 12340   |      | 12340 | 12340 |                         | 1009 | 1197 | 1215                | 0.430    | 6.765    | 6.640             |
| 7.625         | 39.00                       | L-80  | 8820                    | 9180  |      | 9180  | 9180  |                         | 786  | 945  | 895                 | 0.500    | 6.625    | 6.500             |
| 7.625         | 39.00                       | N-80  | 8820                    | 9180  |      | 9180  | 9180  |                         | 798  | 981  | 895                 | 0.500    | 6.625    | 6.500             |
| 7.625         | 39.00                       | C-90  | 9620                    | 10330   |      | 10330 | 10330 |                         | 867  | 1013 | 1007                | 0.500    | 6.625    | 6.500             |
| 7.625         | 39.00                       | C-95  | 10000                   | 10900   |      | 10900 | 10900 |                         | 914  | 1065 | 1063                | 0.500    | 6.625    | 6.500             |
| 7.625         | 39.00                       | T-95  | 10000                   | 10900   |      | 10900 | 10900 |                         | 914  | 1065 | 1063                | 0.500    | 6.625    | 6.500             |
| 7.625         | 39.00                       | P-110 | 11080                   | 12620   |      | 12620 | 12620 |                         | 1066 | 1258 | 1231                | 0.500    | 6.625    | 6.500             |
| 7.625         | 39.00                       | Q-125 | 12060                   | 14340   |      | 14340 | 14340 |                         | 1194 | 1379 | 1399                | 0.500    | 6.625    | 6.500             |
| 7.625         | 42.80                       | L-80  | 10810                   | 10320   |      | 10320 | 9790  |                         | 891  | 1053 | 998                 | 0.562    | 6.501    | 6.376             |
| 7.625         | 42.80                       | N-80  | 10810                   | 10320   |      | 10320 | 9790  |                         | 905  | 1093 | 998                 | 0.562    | 6.501    | 6.376             |
| 7.625         | 42.80                       | C-90  | 11890                   | 11610   |      | 11610 | 11010 |                         | 983  | 1129 | 1122                | 0.562    | 6.501    | 6.376             |
| 7.625         | 42.80                       | C-95  | 12410                   | 12250   |      | 12250 | 11620 |                         | 1037 | 1187 | 1185                | 0.562    | 6.501    | 6.376             |
| 7.625         | 42.80                       | T-95  | 12410                   | 12250   |      | 12250 | 11620 |                         | 1037 | 1187 | 1185                | 0.562    | 6.501    | 6.376             |
| 7.625         | 42.80                       | P-110 | 13920                   | 14190   |      | 14190 | 13460 |                         | 1210 | 1402 | 1372                | 0.562    | 6.501    | 6.376             |
| 7.625         | 42.80                       | Q-125 | 15350                   | 16120   |      | 16120 | 15290 |                         | 1355 | 1536 | 1559                | 0.562    | 6.501    | 6.376             |
| 7.625         | 45.30                       | L-80  | 11510                   | 10920   |      | 10490 | 9790  |                         | 947  | 1109 | 1051                | 0.595    | 6.435    | 6.310             |
| 7.625         | 45.30                       | N-80  | 11510                   | 10920   |      | 10490 | 9790  |                         | 962  | 1152 | 1051                | 0.595    | 6.435    | 6.310             |
| 7.625         | 45.30                       | C-90  | 12950                   | 12290   |      | 11810 | 11010 |                         | 1045 | 1189 | 1183                | 0.595    | 6.435    | 6.310             |
| 7.625         | 45.30                       | C-95  | 13660                   | 12970   |      | 12460 | 11620 |                         | 1101 | 1251 | 1248                | 0.595    | 6.435    | 6.310             |
| 7.625         | 45.30                       | T-95  | 13660                   | 12970   |      | 12460 | 11620 |                         | 1101 | 1251 | 1248                | 0.595    | 6.435    | 6.310             |
| 7.625         | 45.30                       | P-110 | 15430                   | 15020   |      | 14430 | 13460 |                         | 1285 | 1477 | 1446                | 0.595    | 6.435    | 6.310             |
| 7.625         | 45.30                       | Q-125 | 17090                   | 17070   |      | 16400 | 15290 |                         | 1439 | 1619 | 1643                | 0.595    | 6.435    | 6.310             |
| 7.625         | 47.10                       | L-80  | 12040                   | 11480   |      | 10490 | 9790  |                         | 997  | 1160 | 1100                | 0.625    | 6.375    | 6.250             |
| 7.625         | 47.10                       | N-80  | 12040                   | 11480   |      | 10490 | 9790  |                         | 1013 | 1205 | 1100                | 0.625    | 6.375    | 6.250             |
| 7.625         | 47.10                       | C-90  | 13540                   | 12910   |      | 11810 | 11010 |                         | 1100 | 1238 | 1237                | 0.625    | 6.375    | 6.250             |
| 7.625         | 47.10                       | C-95  | 14300                   | 13630   |      | 12460 | 11620 |                         | 1159 | 1300 | 1306                | 0.625    | 6.375    | 6.250             |
| 7.625         | 47.10                       | T-95  | 14300                   | 13630   |      | 12460 | 11620 |                         | 1159 | 1300 | 1306                | 0.625    | 6.375    | 6.250             |
| 7.625         | 47.10                       | P-110 | 16550                   | 15780   |      | 14430 | 13460 |                         | 1353 | 1545 | 1512                | 0.625    | 6.375    | 6.250             |
| 7.625         | 47.10                       | Q-125 | 18700                   | 17930   |      | 16400 | 15290 |                         | 1515 | 1672 | 1718                | 0.625    | 6.375    | 6.250             |
| 7.625         | 51.20                       | C-90  | 14760                   | 14190   |      |       |       |                         |      |      | 1348                | 0.687    | 6.251    | 6.126             |
| 7.625         | 51.20                       | T-95  | 15580                   | 14980   |      |       |       |                         |      |      | 1423                | 0.687    | 6.251    | 6.126             |
| 7.625         | 55.30                       | C-90  | 15960                   | 15490   |      |       |       |                         |      |      | 1458                | 0.750    | 6.125    | 6.000             |
| 7.625         | 55.30                       | T-95  | 16850                   | 16350   |      |       |       |                         |      |      | 1539                | 0.750    | 6.125    | 6.000             |
| 7.750         | 46.10                       | L-80  | 11340                   | 10750   |      | 10490 | 9790  |                         | 841  | 1001 | 1070                | 0.595    | 6.560    | 6.435             |
| 7.750         | 46.10                       | C-90  | 12740                   | 12090   |      | 11810 | 11010 |                         | 928  | 1074 | 1204                | 0.595    | 6.560    | 6.435             |
| 7.750         | 46.10                       | C-95  | 13320                   | 12760   |      | 12460 | 11620 |                         | 978  | 1129 | 1271                | 0.595    | 6.560    | 6.435             |
| 7.750         | 46.10                       | T-95  | 13320                   | 12760   |      | 12460 | 11620 |                         | 978  | 1129 | 1271                | 0.595    | 6.560    | 6.435             |
| 7.750         | 46.10                       | P-110 | 14990                   | 14780   |      | 14430 | 13460 |                         | 1142 | 1334 | 1471                | 0.595    | 6.560    | 6.435             |
| 7.750         | 46.10                       | Q-125 | 16580                   | 16790   |      | 16400 | 15290 |                         | 1279 | 1462 | 1672                | 0.595    | 6.560    | 6.435             |
| 8.625         | 24.00                       | J-55  | 1370                    | 2950  | 2950 |       |       | 244                     |      |      | 381                 | 0.264    | 8.097    | 7.972             |





## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size O.D. In. | Nominal Weight T & C lbs/ft | Grade | Collapse Resistance psi | Internal Yield Pressure at Minimum Yield, psi |      |       |       | Joint Strength 1000 lbs |      |      | Body Yield 1000 lbs | Wall In. | I.D. In. | Drift Diamete API |
|---------------|-----------------------------|-------|-------------------------|---|------|-------|-------|-------------------------|------|------|---------------------|----------|----------|-------------------|
|               |                             |       |                         | PE  | STC  | LTC   | BTC   | STC                     | LTC  | BTC  |                     |          |          |                   |
| 8.625         | 24.00                       | K-55  | 1370                    | 2950  | 2950 |       |       | 263                     |      |      | 381                 | 0.264    | 8.097    | 7.972             |
| 8.625         | 24.00                       | M-65  | 1430                    | 3480  | 3480 |       |       | 302                     |      |      | 451                 | 0.264    | 8.097    | 7.972             |
| 8.625         | 28.00                       | H-40  | 1610                    | 2470  | 2470 |       |       | 233                     |      |      | 318                 | 0.304    | 8.017    | 7.892             |
| 8.625         | 32.00                       | H-40  | 2200                    | 2860  | 2860 |       |       | 279                     |      |      | 366                 | 0.352    | 7.921    | 7.796             |
| 8.625         | 32.00                       | J-55  | 2530                    | 3930  | 3930 | 3930  | 3930  | 372                     | 417  | 579  | 503                 | 0.352    | 7.921    | 7.796             |
| 8.625         | 32.00                       | K-55  | 2530                    | 3930  | 3930 | 3930  | 3930  | 402                     | 452  | 690  | 503                 | 0.352    | 7.921    | 7.796             |
| 8.625         | 32.00                       | M-65  | 2740                    | 4640  | 4640 | 4640  | 4640  | 435                     | 487  | 664  | 595                 | 0.352    | 7.921    | 7.796             |
| 8.625         | 36.00                       | J-55  | 3450                    | 4460  | 4460 | 4460  | 4460  | 434                     | 486  | 654  | 568                 | 0.400    | 7.825    | 7.700             |
| 8.625         | 36.00                       | K-55  | 3450                    | 4460  | 4460 | 4460  | 4460  | 468                     | 526  | 780  | 568                 | 0.400    | 7.825    | 7.700             |
| 8.625         | 36.00                       | M-65  | 3760                    | 5280  | 5280 | 5280  | 5280  | 506                     | 567  | 751  | 672                 | 0.400    | 7.825    | 7.700             |
| 8.625         | 36.00                       | L-80  | 4100                    | 6490  |      | 6490  | 6490  |                         | 678  | 864  | 827                 | 0.400    | 7.825    | 7.700             |
| 8.625         | 36.00                       | N-80  | 4100                    | 6490  |      | 6490  | 6490  |                         | 688  | 895  | 827                 | 0.400    | 7.825    | 7.700             |
| 8.625         | 40.00                       | M-65  | 4890                    | 5930  |      | 5930  | 5930  |                         | 649  | 839  | 751                 | 0.450    | 7.725    | 7.600             |
| 8.625         | 40.00                       | L-80  | 5520                    | 7300  |      | 7300  | 7300  |                         | 776  | 966  | 925                 | 0.450    | 7.725    | 7.600             |
| 8.625         | 40.00                       | N-80  | 5520                    | 7300  |      | 7300  | 7300  |                         | 788  | 1001 | 925                 | 0.450    | 7.725    | 7.600             |
| 8.625         | 40.00                       | C-90  | 5870                    | 8220  |      | 8220  | 8220  |                         | 858  | 1038 | 1040                | 0.450    | 7.725    | 7.600             |
| 8.625         | 40.00                       | C-95  | 6020                    | 8670  |      | 8670  | 8670  |                         | 904  | 1092 | 1098                | 0.450    | 7.725    | 7.600             |
| 8.625         | 40.00                       | T-95  | 6020                    | 8670  |      | 8670  | 8670  |                         | 904  | 1092 | 1098                | 0.450    | 7.725    | 7.600             |
| 8.625         | 40.00                       | P-110 | 6390                    | 10040   |      | 10040 | 10040 |                         | 1055 | 1228 | 1271                | 0.450    | 7.725    | 7.600             |
| 8.625         | 44.00                       | L-80  | 6950                    | 8120  |      | 8120  | 8120  |                         | 874  | 1066 | 1021                | 0.500    | 7.625    | 7.500             |
| 8.625         | 44.00                       | N-80  | 6950                    | 8120  |      | 8120  | 8120  |                         | 887  | 1105 | 1021                | 0.500    | 7.625    | 7.500             |
| 8.625         | 44.00                       | C-90  | 7490                    | 9130  |      | 9130  | 9130  |                         | 965  | 1146 | 1149                | 0.500    | 7.625    | 7.500             |
| 8.625         | 44.00                       | C-95  | 7740                    | 9640  |      | 9640  | 9640  |                         | 1017 | 1206 | 1212                | 0.500    | 7.625    | 7.500             |
| 8.625         | 44.00                       | T-95  | 7740                    | 9640  |      | 9640  | 9640  |                         | 1017 | 1206 | 1212                | 0.500    | 7.625    | 7.500             |
| 8.625         | 44.00                       | P-110 | 8420                    | 11160   |      | 11160 | 11160 |                         | 1186 | 1423 | 1404                | 0.500    | 7.625    | 7.500             |
| 8.625         | 44.00                       | Q-125 | 8980                    | 12680   |      | 12680 | 12680 |                         | 1330 | 1562 | 1595                | 0.500    | 7.625    | 7.500             |
| 8.625         | 49.00                       | L-80  | 8580                    | 9040  |      | 9040  | 9040  |                         | 983  | 1180 | 1129                | 0.557    | 7.511    | 7.386             |
| 8.625         | 49.00                       | N-80  | 8580                    | 9040  |      | 9040  | 9040  |                         | 997  | 1222 | 1129                | 0.557    | 7.511    | 7.386             |
| 8.625         | 49.00                       | C-90  | 9340                    | 10170   |      | 10170 | 10170 |                         | 1085 | 1268 | 1271                | 0.557    | 7.511    | 7.386             |
| 8.625         | 49.00                       | C-95  | 9710                    | 10740   |      | 10740 | 10740 |                         | 1144 | 1334 | 1341                | 0.557    | 7.511    | 7.386             |
| 8.625         | 49.00                       | T-95  | 9710                    | 10740   |      | 10740 | 10740 |                         | 1144 | 1334 | 1341                | 0.557    | 7.511    | 7.386             |
| 8.625         | 49.00                       | P-110 | 10740                   | 12430   |      | 12430 | 12430 |                         | 1335 | 1574 | 1553                | 0.557    | 7.511    | 7.386             |
| 8.625         | 49.00                       | Q-125 | 11650                   | 14130   |      | 14130 | 14130 |                         | 1496 | 1728 | 1765                | 0.557    | 7.511    | 7.386             |
| 9.625         | 32.30                       | H-40  | 1370                    | 2270  |      | 2270  |       | 254                     |      |      | 365                 | 0.312    | 9.001    | 8.845             |
| 9.625         | 36.00                       | H-40  | 1720                    | 2560  |      | 2560  |       | 294                     |      |      | 410                 | 0.352    | 8.921    | 8.765             |
| 9.625         | 36.00                       | J-55  | 2020                    | 3520  | 3520 | 3520  | 3520  | 394                     | 453  | 639  | 564                 | 0.352    | 8.921    | 8.765             |
| 9.625         | 36.00                       | K-55  | 2020                    | 3520  | 3520 | 3520  | 3520  | 423                     | 489  | 755  | 564                 | 0.352    | 8.921    | 8.765             |
| 9.625         | 36.00                       | M-65  | 2190                    | 4160  | 4160 | 4160  | 4160  | 460                     | 529  | 734  | 667                 | 0.352    | 8.921    | 8.765             |
| 9.625         | 40.00                       | J-55  | 2570                    | 3950  | 3950 | 3950  | 3950  | 452                     | 520  | 714  | 630                 | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | K-55  | 2570                    | 3950  | 3950 | 3950  | 3950  | 486                     | 561  | 843  | 630                 | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | M-65  | 2770                    | 4670  | 4670 | 4670  | 4670  | 528                     | 608  | 823  | 745                 | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | L-80  | 3090                    | 5750  |      | 5750  | 5750  | 727                     |      | 947  | 916                 | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | N-80  | 3090                    | 5750  |      | 5750  | 5750  | 737                     |      | 979  | 916                 | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | C-90  | 3250                    | 6460  |      | 6460  | 6460  | 804                     |      | 1021 | 1031                | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | C-95  | 3320                    | 6820  |      | 6820  | 6820  | 847                     |      | 1074 | 1088                | 0.395    | 8.835    | 8.679             |
| 9.625         | 40.00                       | T-95  | 3320                    | 6820  |      | 6820  | 6820  | 847                     |      | 1074 | 1088                | 0.395    | 8.835    | 8.679             |
| 9.625         | 43.50                       | M-65  | 3520                    | 5140  |      | 5140  | 5140  | 679                     |      | 899  | 816                 | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | L-80  | 3810                    | 6330  |      | 6330  | 6330  | 813                     |      | 1038 | 1005                | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | N-80  | 3810                    | 6330  |      | 6330  | 6330  | 825                     |      | 1074 | 1005                | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | C-90  | 4010                    | 7120  |      | 7120  | 7120  | 899                     |      | 1119 | 1130                | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | C-95  | 4120                    | 7510  |      | 7510  | 7510  | 948                     |      | 1178 | 1193                | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | T-95  | 4120                    | 7510  |      | 7510  | 7510  | 948                     |      | 1178 | 1193                | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | P-110 | 4420                    | 8700  |      | 8700  | 8700  | 1106                    |      | 1388 | 1381                | 0.435    | 8.755    | 8.599             |
| 9.625         | 43.50                       | Q-125 | 4620                    | 9890  |      | 9890  | 9890  | 1240                    |      | 1527 | 1570                | 0.435    | 8.755    | 8.599             |
| 9.625         | 47.00                       | L-80  | 4760                    | 6870  |      | 6870  | 6870  | 893                     |      | 1122 | 1086                | 0.472    | 8.681    | 8.525             |





## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size<br>O.D.<br>In. | Nominal<br>Weight<br>T & C<br>lbs/ft | Grade | Collapse<br>Resistance<br>psi | Internal Yield Pressure<br>at Minimum Yield, psi |      |       |       | Joint Strength<br>1000 lbs |      |      | Body<br>Yield<br>1000<br>lbs | Wall<br>In. | I.D.<br>In. | Drift<br>Diameter<br>API |
|---------------------|--------------------------------------|-------|-------------------------------|--|------|-------|-------|----------------------------|------|------|------------------------------|-------------|-------------|--------------------------|
|                     |                                      |       |                               | PE   | STC  | LTC   | BTC   | STC                        | LTC  | BTC  |                              |             |             |                          |
| 9.625               | 47.00                                | N-80  | 4760                          | 6870   |      | 6870  | 6870  | 905                        | 1161 | 1086 | 0.472                        | 8.681       | 8.525       |                          |
| 9.625               | 47.00                                | C-90  | 5000                          | 7720   |      | 7720  | 7720  | 987                        | 1210 | 1221 | 0.472                        | 8.681       | 8.525       |                          |
| 9.625               | 47.00                                | C-95  | 5090                          | 8150   |      | 8150  | 8150  | 1040                       | 1273 | 1289 | 0.472                        | 8.681       | 8.525       |                          |
| 9.625               | 47.00                                | T-95  | 5090                          | 8150   |      | 8150  | 8150  | 1040                       | 1273 | 1289 | 0.472                        | 8.681       | 8.525       |                          |
| 9.625               | 47.00                                | P-110 | 5300                          | 9440   |      | 9440  | 9440  | 1213                       | 1500 | 1493 | 0.472                        | 8.681       | 8.525       |                          |
| 9.625               | 47.00                                | Q-125 | 5640                          | 10730  |      | 10730 | 10730 | 1361                       | 1650 | 1697 | 0.472                        | 8.681       | 8.525       |                          |
| 9.625               | 53.50                                | L-80  | 6620                          | 7930   |      | 7930  | 7930  | 1047                       | 1286 | 1244 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 53.50                                | N-80  | 6620                          | 7930   |      | 7930  | 7930  | 1062                       | 1329 | 1244 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 53.50                                | C-90  | 7120                          | 8920   |      | 8920  | 8920  | 1157                       | 1386 | 1399 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 53.50                                | C-95  | 7340                          | 9410   |      | 9410  | 9410  | 1220                       | 1458 | 1477 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 53.50                                | T-95  | 7340                          | 9410   |      | 9410  | 9410  | 1220                       | 1458 | 1477 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 53.50                                | P-110 | 7950                          | 10900  |      | 10900 | 10900 | 1422                       | 1718 | 1710 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 53.50                                | Q-125 | 8440                          | 12390  |      | 12390 | 12390 | 1595                       | 1890 | 1943 | 0.545                        | 8.535       | 8.379       |                          |
| 9.625               | 58.40                                | L-80  | 7890                          | 8650   |      | 8650  | 8650  | 1151                       | 1396 | 1350 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 58.40                                | N-80  | 7890                          | 8650   |      | 8650  | 8650  | 1167                       | 1443 | 1350 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 58.40                                | C-90  | 8560                          | 9740   |      | 9740  | 9740  | 1272                       | 1504 | 1519 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 58.40                                | C-95  | 8880                          | 10280  |      | 10280 | 10280 | 1341                       | 1583 | 1604 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 58.40                                | T-95  | 8880                          | 10280  |      | 10280 | 10280 | 1341                       | 1583 | 1604 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 58.40                                | P-110 | 9760                          | 11900  |      | 11900 | 11900 | 1564                       | 1865 | 1857 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 58.40                                | Q-125 | 10530                         | 13520  |      | 13520 | 13520 | 1754                       | 2052 | 2110 | 0.595                        | 8.435       | 8.279       |                          |
| 9.625               | 59.40                                | C-90  | 8980                          | 9970   |      |       |       |                            |      | 1553 | 0.609                        | 8.407       | 8.251       |                          |
| 9.625               | 59.40                                | T-95  | 9320                          | 10520  |      |       |       |                            |      | 1634 | 0.609                        | 8.407       | 8.251       |                          |
| 9.625               | 64.90                                | C-90  | 10800                         | 11000  |      |       |       |                            |      | 1701 | 0.672                        | 8.281       | 8.125       |                          |
| 9.625               | 64.90                                | T-95  | 11260                         | 11610  |      |       |       |                            |      | 1796 | 0.672                        | 8.281       | 8.125       |                          |
| 9.625               | 70.30                                | C-90  | 12610                         | 12010  |      |       |       |                            |      | 1845 | 0.734                        | 8.157       | 8.001       |                          |
| 9.625               | 70.30                                | T-95  | 13180                         | 12680  |      |       |       |                            |      | 1948 | 0.734                        | 8.157       | 8.001       |                          |
| 9.625               | 75.60                                | C-90  | 13670                         | 13040  |      |       |       |                            |      | 1989 | 0.797                        | 8.031       | 7.875       |                          |
| 9.625               | 75.60                                | T-95  | 14430                         | 13770  |      |       |       |                            |      | 2100 | 0.797                        | 8.031       | 7.875       |                          |
| 10.750              | 40.50                                | H-40  | 1390                          | 2280   | 2280 |       |       | 314                        |      | 457  | 0.350                        | 10.050      | 9.894       |                          |
| 10.750              | 40.50                                | J-55  | 1580                          | 3130   | 3130 |       | 3130  | 420                        |      | 700  | 0.350                        | 10.050      | 9.894       |                          |
| 10.750              | 40.50                                | K-55  | 1580                          | 3130   | 3130 |       | 3130  | 450                        |      | 819  | 0.350                        | 10.050      | 9.894       |                          |



## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size<br>O.D. | Nominal<br>Weight<br>lbs/ft | Grade | Collapse<br>Resistance | Internal Yield Pressure<br>at Minimum Yield, psi |       |       |       | Joint Strength<br>1000 lbs |      |       | Body<br>Yield<br>lbs | Wall<br>in. | I.D.<br>in. | Drift Diameter<br>in . | API |
|--------------|-----------------------------|-------|------------------------|--|-------|-------|-------|----------------------------|------|-------|----------------------|-------------|-------------|------------------------|-----|
|              |                             |       |                        | PE   | STC   | LTC   | BTC   | STC                        | LTC  | BTC   |                      |             |             |                        |     |
| 10.750       | 40.50                       | M-65  | 1680                   | 3700   | 3700  | 3700  | 3700  | 491                        | 806  | 743   | 0.350                | 10.050      | 9.894       |                        |     |
| 10.750       | 40.50                       | N-80  | 1730                   | 4560   | 4560  | 4560  | 4560  | 597                        | 964  | 915   | 0.350                | 10.050      | 9.894       |                        |     |
| 10.750       | 45.50                       | J-55  | 2090                   | 3580   | 3580  | 3580  | 3580  | 493                        | 796  | 715   | 0.400                | 9.950       | 9.794       |                        |     |
| 10.750       | 45.50                       | K-55  | 2090                   | 3580   | 3580  | 3580  | 3580  | 528                        | 931  | 715   | 0.400                | 9.950       | 9.794       |                        |     |
| 10.750       | 45.50                       | M-65  | 2280                   | 4230   | 4230  | 4230  | 4230  | 576                        | 916  | 845   | 0.400                | 9.950       | 9.794       |                        |     |
| 10.750       | 45.50                       | N-80  | 2470                   | 5210   | 5210  | 5210  | 5210  | 701                        | 1097 | 1040  | 0.400                | 9.950       | 9.794       |                        |     |
| 10.750       | 51.00                       | J-55  | 2700                   | 4030   | 4030  | 4030  | 4030  | 565                        | 891  | 801   | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | K-55  | 2700                   | 4030   | 4030  | 4030  | 4030  | 606                        | 1043 | 801   | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | M-65  | 2870                   | 4760   | 4760  | 4760  | 4760  | 661                        | 1026 | 946   | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | L-80  | 3220                   | 5860   | 5860  | 5860  | 5860  | 794                        | 1190 | 1165  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | N-80  | 3220                   | 5860   | 5860  | 5860  | 5860  | 804                        | 1228 | 1165  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | C-90  | 3400                   | 6590   | 6590  | 6590  | 6590  | 879                        | 1287 | 1311  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | C-95  | 3480                   | 6960   | 6960  | 6960  | 6960  | 927                        | 1354 | 1383  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | T-95  | 3480                   | 6960   | 6960  | 6960  | 6960  | 927                        | 1354 | 1383  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | P-110 | 3660                   | 8060   | 8060  | 8060  | 8060  | 1080                       | 1594 | 1602  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 51.00                       | Q-125 | 3740                   | 9160   | 9160  | 9160  | 9160  | 1213                       | 1758 | 1820  | 0.450                | 9.850       | 9.694       |                        |     |
| 10.750       | 55.50                       | M-65  | 3690                   | 5240   | 5240  | 5240  | 5240  | 736                        | 1124 | 877   | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | L-80  | 4020                   | 6450   | 6450  | 6450  | 6450  | 884                        | 1303 | 1276  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | N-80  | 4020                   | 6450   | 6450  | 6450  | 6450  | 895                        | 1345 | 1276  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | C-90  | 4160                   | 7250   | 7250  | 7250  | 7250  | 979                        | 1409 | 1435  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | C-95  | 4290                   | 7660   | 7660  | 7660  | 7660  | 1032                       | 1483 | 1515  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | T-95  | 4290                   | 7660   | 7660  | 7660  | 7660  | 1032                       | 1483 | 1515  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | P-110 | 4610                   | 8860   | 8860  | 8860  | 8860  | 1203                       | 1745 | 1754  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 55.50                       | Q-125 | 4850                   | 10070  | 10070 | 10070 | 10070 | 1351                       | 1925 | 1993  | 0.495                | 9.760       | 9.604       |                        |     |
| 10.750       | 60.70                       | N-80  | 5160                   | 7100   | 7100  | 7100  | 7100  | 996                        | 1473 | 1398  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | L-80  | 5160                   | 7100   | 7100  | 7100  | 7100  | 983                        | 1428 | 1398  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | N-80  | 5160                   | 7100   | 7100  | 7100  | 7100  | 996                        | 1473 | 1398  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | C-90  | 5460                   | 7980   | 7980  | 7980  | 7980  | 1089                       | 1544 | 1573  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | C-95  | 5590                   | 8430   | 8430  | 8430  | 8430  | 1148                       | 1625 | 1660  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | T-95  | 5590                   | 8430   | 8430  | 8430  | 8430  | 1148                       | 1625 | 1660  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | P-110 | 5880                   | 9760   | 9760  | 9760  | 9760  | 1338                       | 1912 | 1922  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 60.70                       | Q-125 | 6070                   | 11090  | 11090 | 11090 | 11090 | 1503                       | 2109 | 2184  | 0.545                | 9.660       | 9.504       |                        |     |
| 10.750       | 65.70                       | L-80  | 6300                   | 7750   | 7750  | 7750  | 7750  | 1082                       | 1551 | 1519  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 65.70                       | N-80  | 6300                   | 7750   | 7750  | 7750  | 7750  | 1096                       | 1600 | 1519  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 65.70                       | C-90  | 6760                   | 8720   | 8720  | 8720  | 8720  | 1198                       | 1677 | 1708  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 65.70                       | C-95  | 6960                   | 9200   | 9200  | 9200  | 9200  | 1263                       | 1765 | 1803  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 65.70                       | T-95  | 6960                   | 9200   | 9200  | 9200  | 9200  | 1263                       | 1765 | 1803  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 65.70                       | P-110 | 7500                   | 10650  | 10650 | 10650 | 10650 | 1472                       | 2077 | 2088  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 65.70                       | Q-125 | 7920                   | 12110  | 12110 | 12110 | 12110 | 1653                       | 2291 | 2373  | 0.595                | 9.560       | 9.404       |                        |     |
| 10.750       | 71.10                       | P-110 | 9300                   | 11640  | 11240 | 10980 | 1618  | 2257                       | 2269 | 0.650 | 9.450                | 9.294       |             |                        |     |
| 10.750       | 71.10                       | Q-125 | 9990                   | 13230  | 12780 | 12480 | 1817  | 2489                       | 2578 | 0.650 | 9.450                | 9.294       |             |                        |     |
| 10.750       | 73.20                       | C-90  | 8760                   | 9850   |       |       |       |                            | 1915 | 0.672 | 9.406                | 9.250       |             |                        |     |
| 10.750       | 73.20                       | T-95  | 9090                   | 10390  |       |       |       |                            | 2021 | 0.672 | 9.406                | 9.250       |             |                        |     |
| 10.750       | 79.20                       | C-90  | 10370                  | 10750  |       |       |       |                            | 2079 | 0.734 | 9.282                | 9.126       |             |                        |     |
| 10.750       | 79.20                       | T-95  | 10800                  | 11350  |       |       |       |                            | 2194 | 0.734 | 9.282                | 9.126       |             |                        |     |
| 10.750       | 85.30                       | C-90  | 12010                  | 11680  |       |       |       |                            | 2243 | 0.797 | 9.156                | 9.000       |             |                        |     |
| 10.750       | 85.30                       | T-95  | 12540                  | 12330  |       |       |       |                            | 2367 | 0.797 | 9.156                | 9.000       |             |                        |     |
| 11.750       | 42.00                       | H-40  | 1040                   | 1980   | 1980  | 1980  | 307   | 554                        | 478  | 0.333 | 11.084               | 10.928      |             |                        |     |
| 11.750       | 47.00                       | J-55  | 1510                   | 3070   | 3070  | 3070  | 477   | 807                        | 737  | 0.375 | 11.000               | 10.844      |             |                        |     |
| 11.750       | 47.00                       | K-55  | 1510                   | 3070   | 3070  | 3070  | 509   | 935                        | 737  | 0.375 | 11.000               | 10.844      |             |                        |     |
| 11.750       | 47.00                       | M-65  | 1590                   | 3630   | 3630  | 3630  | 557   | 931                        | 871  | 0.375 | 11.000               | 10.844      |             |                        |     |



## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size O.D. In. | Nominal Weight T & C lbs/ft | Grade | Collapse Resistance psi | Internal Yield Pressure at Minimum Yield, psi |       |     |       | Joint Strength 1000 lbs |      |      | Body Yield 1000 lbs | Wall In. | I.D. In. | Drift Diameter in. API |
|---------------|-----------------------------|-------|-------------------------|---|-------|-----|-------|-------------------------|------|------|---------------------|----------|----------|------------------------|
|               |                             |       |                         | PE  | STC   | LTC | BTC   | STC                     | LTC  | BTC  |                     |          |          |                        |
| 11.750        | 54.00                       | J-55  | 2070                    | 3560  | 3560  |     | 3560  | 568                     | 931  | 850  | 0.435               | 10.880   | 10.724   |                        |
| 11.750        | 54.00                       | K-55  | 2070                    | 3560  | 3560  |     | 3560  | 606                     | 1079 | 850  | 0.435               | 10.880   | 10.724   |                        |
| 11.750        | 54.00                       | M-65  | 2250                    | 4210  | 4210  |     | 4210  | 665                     | 1074 | 1005 | 0.435               | 10.880   | 10.724   |                        |
| 11.750        | 60.00                       | J-55  | 2660                    | 4010  | 4010  |     | 4010  | 649                     | 1042 | 952  | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | K-55  | 2660                    | 4010  | 4010  |     | 4010  | 693                     | 1208 | 952  | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | M-65  | 2840                    | 4730  | 4730  |     | 4730  | 759                     | 1201 | 1125 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | L-80  | 3180                    | 5830  | 5830  |     | 5830  | 913                     | 1399 | 1384 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | N-80  | 3180                    | 5830  | 5830  |     | 5830  | 924                     | 1440 | 1384 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | C-90  | 3360                    | 6550  | 6550  |     | 6550  | 1011                    | 1517 | 1557 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | C-95  | 3440                    | 6920  | 6920  |     | 6920  | 1066                    | 1596 | 1644 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | T-95  | 3440                    | 6920  | 6920  |     | 6920  | 1066                    | 1596 | 1644 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | P-110 | 3610                    | 8010  | 8010  |     | 8010  | 1242                    | 1877 | 1903 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 60.00                       | Q-125 | 3680                    | 9100  | 9100  |     | 9100  | 1396                    | 2074 | 2163 | 0.489               | 10.772   | 10.616   |                        |
| 11.750        | 65.00                       | M-65  | 3580                    | 5170  | 5170  |     | 5170  | 837                     | 1307 | 1223 | 0.534               | 10.682   | 10.526   |                        |
| 11.750        | 65.00                       | L-80  | 3870                    | 6360  | 6360  |     | 6360  | 1007                    | 1521 | 1505 | 0.534               | 10.682   | 10.526   |                        |
| 11.750        | 65.00                       | N-80  | 3870                    | 6360  | 6360  |     | 6360  | 1019                    | 1566 | 1505 | 0.534               | 10.682   | 10.625   |                        |
| 11.750        | 65.00                       | P-110 | 4480                    | 8750  | 8750  |     | 8750  | 1371                    | 2041 | 2070 | 0.534               | 10.682   | 10.526   |                        |
| 11.750        | 65.00                       | Q-125 | 4690                    | 9940  | 9940  |     | 9940  | 1540                    | 2256 | 2352 | 0.534               | 10.682   | 10.526   |                        |
| 11.750        | 71.00                       | P-110 | 5470                    | 9530  | 9530  |     | 9530  | 1506                    | 2215 | 2246 | 0.582               | 10.586   | 10.430   |                        |
| 11.750        | 71.00                       | Q-125 | 5760                    | 10840   | 10840 |     | 10840 | 1693                    | 2448 | 2552 | 0.582               | 10.586   | 10.430   |                        |
| 13.375        | 48.00                       | H-40  | 740                     | 1730  | 1730  |     | 1730  | 322                     | 607  | 541  | 0.330               | 12.715   | 12.559   |                        |
| 13.375        | 54.50                       | J-55  | 1130                    | 2730  | 2730  |     | 2730  | 514                     | 909  | 853  | 0.380               | 12.615   | 12.459   |                        |
| 13.375        | 54.50                       | K-55  | 1130                    | 2730  | 2730  |     | 2730  | 547                     | 1038 | 853  | 0.380               | 12.615   | 12.459   |                        |
| 13.375        | 54.50                       | M-65  | 1140                    | 3230  | 3230  |     | 3230  | 602                     | 1052 | 1008 | 0.380               | 12.615   | 12.459   |                        |
| 13.375        | 61.00                       | J-55  | 1540                    | 3090  | 3090  |     | 3090  | 595                     | 1025 | 962  | 0.430               | 12.515   | 12.359   |                        |
| 13.375        | 61.00                       | K-55  | 1540                    | 3090  | 3090  |     | 3090  | 633                     | 1169 | 962  | 0.430               | 12.515   | 12.359   |                        |
| 13.375        | 61.00                       | M-65  | 1620                    | 3660  | 3660  |     | 3660  | 697                     | 1185 | 1137 | 0.430               | 12.515   | 12.359   |                        |
| 13.375        | 68.00                       | J-55  | 1950                    | 3450  | 3450  |     | 3450  | 675                     | 1140 | 1069 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | K-55  | 1950                    | 3450  | 3450  |     | 3450  | 718                     | 1300 | 1069 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | M-65  | 2110                    | 4080  | 4080  |     | 4080  | 791                     | 1318 | 1264 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | L-80  | 2260                    | 5020  | 5020  |     | 5020  | 952                     | 1545 | 1556 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | N-80  | 2260                    | 5020  | 5020  |     | 5020  | 963                     | 1585 | 1556 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | C-90  | 2320                    | 5650  | 5650  |     | 5650  | 1057                    | 1683 | 1750 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | S-95  | 2910                    | 5970  | 5970  |     | 5970  | 1125                    | 1812 | 1847 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | C-95  | 2330                    | 5970  | 5970  |     | 5970  | 1114                    | 1772 | 1847 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | T-95  | 2330                    | 5970  | 5970  |     | 5970  | 1114                    | 1772 | 1847 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 68.00                       | P-110 | 2340                    | 6910  | 6910  |     | 6910  | 1297                    | 2079 | 2139 | 0.480               | 12.415   | 12.259   |                        |
| 13.375        | 72.00                       | M-65  | 2430                    | 4370  | 4370  |     | 4370  | 854                     | 1408 | 1350 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | L-80  | 2670                    | 5380  | 5380  |     | 5380  | 1029                    | 1650 | 1661 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | N-80  | 2670                    | 5380  | 5380  |     | 5380  | 1040                    | 1693 | 1661 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | C-90  | 2780                    | 6050  | 6050  |     | 6050  | 1142                    | 1798 | 1869 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | C-95  | 2820                    | 6390  | 6390  |     | 6390  | 1204                    | 1893 | 1973 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | T-95  | 2820                    | 6390  | 6390  |     | 6390  | 1204                    | 1893 | 1973 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | P-110 | 2890                    | 7400  | 7400  |     | 7400  | 1402                    | 2221 | 2284 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 72.00                       | Q-125 | 2880                    | 8410  | 8410  |     | 8410  | 1577                    | 2463 | 2596 | 0.514               | 12.347   | 12.191   |                        |
| 13.375        | 80.70                       | P-110 | 4000                    | 8350  |       |     | 8350  |                         | 2493 | 2565 | 0.580               | 12.215   | 12.059   |                        |
| 13.375        | 80.70                       | Q-125 | 4140                    | 9490  |       |     | 9490  |                         | 2765 | 2914 | 0.580               | 12.215   | 12.059   |                        |





## CASING DIMENSIONS AND MINIMUM PERFORMANCE PROPERTIES

| Size O.D. In. | Nominal Weight T & C lbs/ft | Grade | Collapse Resistance psi | Internal Yield Pressure at Minimum Yield, psi |      |      |      | Joint Strength 1000 lbs |      |      | Body Yield 1000 lbs | Wall In. | I.D. In. | Drift Diameter in. API |        |
|---------------|-----------------------------|-------|-------------------------|---|------|------|------|-------------------------|------|------|---------------------|----------|----------|------------------------|--------|
|               |                             |       |                         | PE  | STC  | LTC  | BTC  | STC                     | LTC  | BTC  |                     |          |          |                        |        |
| 13.375        | 86.00                       | P-110 | 4780                    | 9000  |      |      |      | 8980                    |      |      | 2677                | 2754     | 0.625    | 12.12                  | 11.969 |
| 13.375        | 86.00                       | Q-125 | 5030                    | 10220   |      |      |      | 10200                   |      |      | 2969                | 3129     | 0.625    | 12.12                  | 11.969 |
| 13.375        |                             |       |                         |   |      |      |      |                         |      |      |                     |          |          |                        |        |
| 16.000        | 65.00                       | H-40  | 630                     | 1640  | 1640 |      | 1640 | 439                     |      | 781  | 736                 | 0.375    | 15.25    | 15.062                 |        |
| 16.000        | 75.00                       | J-55  | 1020                    | 2630  | 2630 |      | 2630 | 710                     |      | 1200 | 1178                | 0.438    | 15.124   | 14.936                 |        |
| 16.000        | 75.00                       | K-55  | 1020                    | 2630  | 2630 |      | 2630 | 752                     |      | 1331 | 1178                | 0.438    | 15.124   | 14.936                 |        |
| 16.000        | 75.00                       | M-65  | 1020                    | 3110  | 3110 |      | 3110 | 832                     |      | 1394 | 1392                | 0.438    | 15.124   | 14.936                 |        |
| 16.000        | 84.00                       | J-55  | 1410                    | 2980  | 2980 |      | 2980 | 817                     |      | 1351 | 1326                | 0.495    | 15.010   | 14.822                 |        |
| 16.000        | 84.00                       | K-55  | 1410                    | 2980  | 2980 |      | 2980 | 865                     |      | 1499 | 1326                | 0.495    | 15.010   | 14.822                 |        |
| 16.000        | 84.00                       | M-65  | 1470                    | 3520  | 3520 |      | 3520 | 957                     |      | 1570 | 1567                | 0.495    | 15.010   | 14.822                 |        |
| 16.000        | 84.00                       | N-80  | 1480                    | 4330  | 4330 |      | 4330 | 1167                    |      | 1898 | 1929                | 0.495    | 15.010   | 14.822                 |        |
| 16.000        | 84.00                       | P-110 | 1480                    | 5960  | 5960 |      | 5960 | 1575                    |      | 2518 | 2652                | 0.495    | 15.010   | 14.822                 |        |
| 16.000        | 84.00                       | Q-125 | 1480                    | 6770  | 6770 |      | 6770 | 1773                    |      | 2809 | 3014                | 0.495    | 15.010   | 14.822                 |        |
| 16.000        | 95.00                       | N-80  | 2180                    | 4950  |      |      | 4950 |                         |      | 2161 | 2196                | 0.566    | 14.868   |                        |        |
| 16.000        | 95.00                       | P-110 | 2230                    | 6810  |      |      | 6810 |                         |      | 2866 | 3019                | 0.566    | 14.868   |                        |        |
| 16.000        | 95.00                       | Q-125 | 2230                    | 7740  |      |      | 7740 |                         |      | 3198 | 3431                | 0.566    | 14.868   |                        |        |
| 16.000        | 97.00                       | N-80  | 2270                    | 5030  |      |      | 5030 |                         |      | 2194 | 2230                | 0.575    | 14.85    |                        |        |
| 16.000        | 97.00                       | P-110 | 2340                    | 6920  |      |      | 6920 |                         |      | 2910 | 3067                | 0.575    | 14.85    |                        |        |
| 16.000        | 97.00                       | Q-125 | 2340                    | 7860  |      |      | 7860 |                         |      | 3246 | 3485                | 0.575    | 14.85    |                        |        |
| 16.000        | 109.00                      | J-55  | 2560                    | 3950  | 3950 |      | 3950 | 1116                    |      | 1772 | 1739                | 0.656    | 14.69    | 14.500                 |        |
| 16.000        | 109.00                      | K-55  | 2560                    | 3950  | 3950 |      | 3950 | 1181                    |      | 1965 | 1739                | 0.656    | 14.69    | 14.500                 |        |
| 16.000        | 109.00                      | N-80  | 3080                    | 5740  | 5740 |      | 5740 | 1594                    |      | 2489 | 1739                | 0.656    | 14.69    | 14.500                 |        |
| 16.000        | 118.00                      | J-55  | 3170                    | 4300  | 4300 |      | 4300 | 1224                    |      | 1924 | 1889                | 0.715    | 14.570   | 14.382                 |        |
| 16.000        | 118.00                      | K-55  | 3170                    | 4300  | 4300 |      | 4300 | 1296                    |      | 2131 | 1889                | 0.715    | 14.570   | 14.382                 |        |
| 16.000        | 118.00                      | N-80  | 3680                    | 6260  | 6260 |      | 6260 | 1741                    |      | 2703 | 2747                | 0.715    | 14.570   | 14.382                 |        |
| 18.625        | 87.50                       | H-40  | 630                     | 1630  | 1630 |      | 1630 | 559                     |      | 993  | 995                 | 0.435    | 17.755   | 17.567                 |        |
| 18.625        | 87.50                       | J-55  | 630                     | 2250  | 2250 |      | 2250 | 754                     |      | 1329 | 1368                | 0.435    | 17.755   | 17.567                 |        |
| 18.625        | 87.50                       | K-55  | 630                     | 2250  | 2250 |      | 2250 | 794                     |      | 1427 | 1368                | 0.435    | 17.755   | 17.567                 |        |
| 18.625        | 87.50                       | N-80  | 630                     | 3270  | 3270 |      | 3270 | 1079                    |      | 1887 | 1990                | 0.435    | 17.755   | 17.567                 |        |
| 18.625        | 94.50                       | H-40  | 780                     | 1760  | 1760 |      | 1760 | 609                     |      | 1067 | 1068                | 0.468    | 17.689   | 17.501                 |        |
| 18.625        | 94.50                       | J-55  | 780                     | 2420  | 2420 |      | 2420 | 821                     |      | 1427 | 1469                | 0.468    | 17.689   | 17.501                 |        |
| 18.625        | 94.50                       | K-55  | 780                     | 2420  | 2420 |      | 2420 | 865                     |      | 1533 | 1469                | 0.468    | 17.689   | 17.501                 |        |
| 18.625        | 94.50                       | N-80  | 780                     | 3520  | 3520 |      | 3520 | 1174                    |      | 2027 | 2137                | 0.468    | 17.689   | 17.501                 |        |
| 18.625        | 106.00                      | H-40  | 1140                    | 2000  | 2000 |      | 2000 | 703                     |      | 1206 | 1208                | 0.531    | 17.563   | 17.375                 |        |
| 18.625        | 106.00                      | J-55  | 1140                    | 2740  | 2740 |      | 2740 | 948                     |      | 1613 | 1661                | 0.531    | 17.563   | 17.375                 |        |
| 18.625        | 106.00                      | K-55  | 1140                    | 2740  | 2740 |      | 2740 | 998                     |      | 1733 | 1661                | 0.531    | 17.563   | 17.375                 |        |
| 18.625        | 106.00                      | N-80  | 1150                    | 3990  | 3990 |      | 3990 | 1356                    |      | 2292 | 2416                | 0.531    | 17.563   | 17.375                 |        |
| 18.625        | 117.50                      | H-40  | 1500                    | 2230  | 2230 |      | 2230 | 795                     |      | 1342 | 1344                | 0.593    | 17.439   | 17.251                 |        |
| 18.625        | 117.50                      | J-55  | 1510                    | 3060  | 3060 |      | 3060 | 1072                    |      | 1795 | 1849                | 0.593    | 17.439   | 17.251                 |        |
| 18.625        | 117.50                      | K-55  | 1510                    | 3060  | 3060 |      | 3060 | 1129                    |      | 1929 | 1849                | 0.593    | 17.439   | 17.251                 |        |
| 18.625        | 117.50                      | N-80  | 1620                    | 4460  | 4460 |      | 4460 | 1534                    |      | 2551 | 2689                | 0.593    | 17.439   | 17.251                 |        |
| 20.000        | 94.00                       | H-40  | 520                     | 1530  | 1530 |      | 1530 | 581                     |      | 1041 | 1077                | 0.438    | 19.124   | 18.936                 |        |
| 20.000        | 94.00                       | J-55  | 520                     | 2110  | 2110 | 2110 | 2110 | 783                     | 907  | 1402 | 1480                | 0.438    | 19.124   | 18.936                 |        |
| 20.000        | 94.00                       | K-55  | 520                     | 2110  | 2110 | 2110 | 2110 | 824                     | 955  | 1479 | 1480                | 0.438    | 19.124   | 18.936                 |        |
| 20.000        | 106.50                      | J-55  | 770                     | 2410  | 2410 | 2410 | 2410 | 913                     | 1056 | 1595 | 1685                | 0.500    | 19.000   | 18.812                 |        |
| 20.000        | 106.50                      | K-55  | 770                     | 2410  | 2410 | 2410 | 2410 | 960                     | 1113 | 1683 | 1685                | 0.500    | 19.000   | 18.812                 |        |
| 20.000        | 106.50                      | N-80  | 770                     | 3500  | 3500 | 3500 | 3500 | 1307                    | 1514 | 2281 | 2450                | 0.500    | 19.000   | 18.812                 |        |
| 20.000        | 133.00                      | K-55  | 1500                    | 3060  | 3060 | 3060 | 3060 | 1253                    | 1453 | 2123 | 2125                | 0.635    | 18.730   | 18.542                 |        |
| 20.000        | 133.00                      | L-80  | 1600                    | 4450  | 4450 | 4450 | 4450 | 1692                    | 1958 | 2849 | 3091                | 0.635    | 18.730   | 18.542                 |        |
| 20.000        | 133.00                      | N-80  | 1600                    | 4450  | 4450 | 4450 | 4450 | 1707                    | 1976 | 2877 | 3091                | 0.635    | 18.730   | 18.542                 |        |
| 20.000        | 169.00                      | K-55  | 2500                    | 3910  | 3230 | 3430 | 3380 | 1402                    | 1732 | 2689 | 2692                | 0.812    | 18.376   | 18.188                 |        |
| 20.000        | 169.00                      | L-80  | 3020                    | 5680  | 4690 | 4990 | 4920 | 2202                    | 2549 | 3610 | 3916                | 0.812    | 18.376   | 18.188                 |        |
| 20.000        | 169.00                      | N-80  | 3020                    | 5680  | 4690 | 4990 | 4920 | 2221                    | 2573 | 3645 | 3916                | 0.812    | 18.376   | 18.188                 |        |



## CASING AND TUBING CONNECTIONS

### SEAL-LOCK BOSS

Large O.D. casing connection.

- 7-<sup>5</sup>/<sub>8</sub>" to 16"<sup>A</sup>
- Hooked Thread Design
- Pin-to-Pin Torque Shoulder
- Flush ID.



### SEAL-LOCK HT

High torque casing and tubing connection.

- 2-<sup>1</sup>/<sub>16</sub>" to 7"
- Hooked Thread Design
- Close Tolerance Thread Seal
- Pins Shoulder for Torque Stop
- Optional Pressure Ring



### SEAL-LOCK HC

High compression and bending loads for directional wells.

- 4-<sup>1</sup>/<sub>2</sub>" to 13-<sup>5</sup>/<sub>8</sub>"
- Hooked Thread Design
- Metal-to-Metal Seal
- Internal Torque Shoulder
- Optional Pressure Ring



### SEAL-LOCK SEMI-FLUSH

Casing connection for compression, torsion and bending connection for slim-hole directional wells.

- 4-<sup>1</sup>/<sub>2</sub>" to 14"
- Hooked Thread Design
- Multiple Metal-to-Metal Seals
- Torque Shoulder
- Flush Bore I.D.
- Thread Dope Relief Grooves



### SEAL-LOCK APEX

For all pressure environments and bending.

- 4-<sup>1</sup>/<sub>2</sub>" to 13-<sup>5</sup>/<sub>8</sub>"
- Hooked Thread Design
- Metal-to-Metal Seal
- Internal Torque Shoulder
- Internal and External Pressure Integrity
- Lubricant Relief Groove



### SEAL-LOCK FLUSH

Liner casing and tubing connection.

- 2-<sup>3</sup>/<sub>8</sub>" to 13-<sup>5</sup>/<sub>8</sub>"
- True Flush OD
- Hooked Thread Design
- Metal-to-Metal Seal
- External Torque Shoulder





## CASING AND TUBING CONNECTIONS

### SLX

- High performance casing connection.
- 4-1/2" to 13-5/8"
  - Hooked Thread Design
  - Metal-to-Metal Seals
  - Torque Shoulder
  - Slim OD
  - Combined Load Performance Capability



### Type 513

- Production and drilling liner connection.
- 4-1/2" to 16"
  - Wedge Thread™ Design
  - Metal-to-Metal Seal
  - Thread and Lubricant Seal
  - Pipe Body OD
  - Torque and Compression Capability



### Type 511

- Large diameter surface casing and repair string connection.
- 2-1/16" to 18-5/8"
  - Wedge Thread™ Design
  - Thread and Lubricant Seal
  - Pipe Body OD
  - Structural Capability on High D/t Pipe



### Type 523

- High performance casing connection.
- 7" to 16"
  - Wedge Thread™ Design
  - Metal-to-Metal Seal
  - Thread and Lubricant Seal
  - Slim OD
  - Combined Load Performance Capability



### Type 521

- Large diameter surface casing and horizontal liner connection.
- 4" to 18-5/8"
  - Wedge Thread™ Design
  - Thread and Lubricant Seal
  - Slim OD
  - Structural Capability on High D/t Pipe



### Type 563

- Production, geothermal and steam injection casing connection.
- 5" to 18-5/8"
  - Wedge Thread™ Design
  - Metal-to-Metal Seal
  - Thread and Lubricant Seal
  - Threaded and Coupled
  - Cycling Tension and Compression Capability





## CASING AND TUBING CONNECTIONS

### For all pressure environments and bending.

- 5" to 14"<sup>A</sup>
- Modified Buttress Thread, 5 TPI
- Metal-to-Metal Seal
- Torque Shoulders
- Flush I.D.
- K1 Version for Plastic Coating
- FGL Version for Fiberglass Lining



### For all pressure environments and bending.

- 5-<sup>1</sup>/<sub>2</sub>" to 10-<sup>3</sup>/<sub>4</sub>"
- Hooked Thread Design, 4 TPI
- Metal-to-Metal Seal
- Flush I.D.
- Torque Shoulders



### High-performance tubing connection.

- 2-<sup>3</sup>/<sub>8</sub>" to 4-<sup>1</sup>/<sub>2</sub>"
- Modified Buttress Thread, 6 TPI
- Metal-to-Metal Seal
- Flush I.D.
- Torque Shoulders
- K1 Version for Plastic Coating
- FGL Version for Fiberglass Lining





## CASING SELECTION CHART

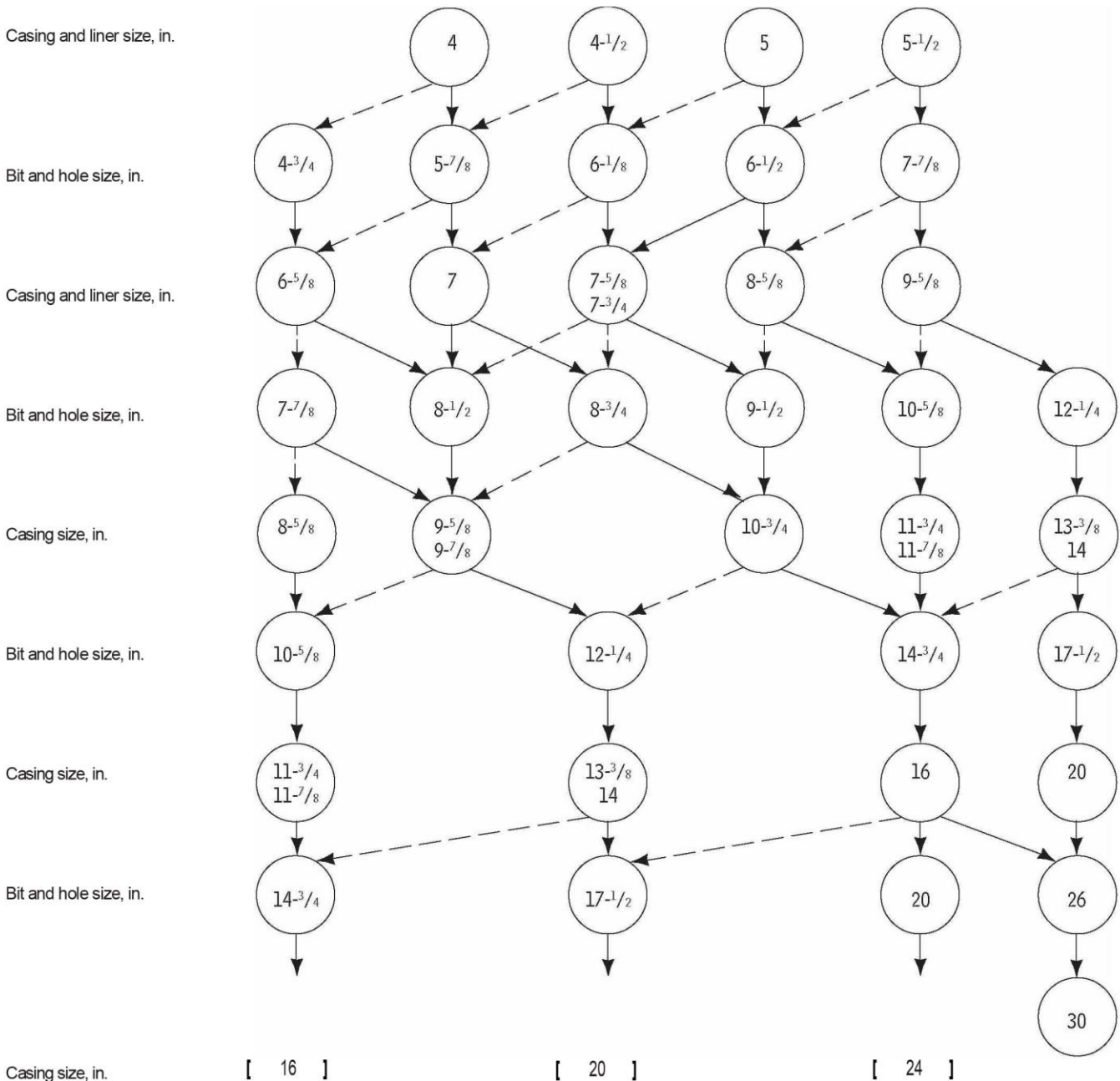
The chart below can be used to select the casing bit sizes required to fulfill many drilling programs. To use it, determine the casing or liner size for the last size pipe to be run. Enter the chart at that point. The flow of the chart then indicates hole sizes that may be required to set that size pipe (i.e. 5-inch liner inside 6-1/8 inch or 6-1/2 inch hole).

Solid lines indicate commonly used bits for that size pipe and can be considered to have adequate clearance to run and cement the casing or liner (i.e. 5-1/2 inch casing inside 7-7/8 inch hole). The broken lines indicate less common hole sizes used (i.e. 5 inch inside 6-1/8 inch hole). The selection of one of these broken paths requires special attention be given to the connection, mud weight, cementing, and doglegs.

Large connection OD, thick mud cake buildup, problem cementing areas (high water loss, lost returns, etc.), and doglegs aggravate the attempt to run casing and liners in low clearance situations.

Once the hole size has been selected, a casing large enough to allow passage of a bit to make that hole can be selected. The solid lines are commonly required casing sizes encompassing most weights (i.e. 6-1/2 inch bit inside 7-5/8 inch casing).

This selection process is repeated until the anticipated number of casing sizes has been reached.





## WELLHEAD PRESSURE CALCULATION USING REAL GAS LAW

Natural gas, condensates and well fluids differ from ideal gasses in that they are compressible. Gas compressibility's effect on wellhead pressure becomes considerable as well depth and bottom hole pressure increase, so the real gas law should be used to predict shut-in surface pressure for abnormally pressured wells, or wells deeper than 12,000 ft.

The real gas law accounts for compressibility with a gas deviation factor ( $z$ ) which is derived from the fluids' pseudo-critical properties. Since gas density and internal pressure gradients are assumed to be constant for casing designs,  $z$  is an average value based on the well's depth and average temperature and pressure.

To use the real gas law to determine wellbore pressure, one must know: the pseudo-critical temperature ( $T_{pc}$ ), the pseudo-critical pressure ( $P_{pc}$ ), and the gas specific gravity relative to air ( $SG$ ).

These values may be found from the gas's composition and a table of physical data or may be estimated by assuming the hydrocarbons are either condensate fluids or miscellaneous gases and adjusting for any nitrogen ( $N_2$ ), hydrogen sulfide ( $H_2S$ ) or carbon dioxide ( $CO_2$ ) present.

$$\begin{aligned} T_{pci} &= a + (b)SG_C - (c)SG_C^2 \\ P_{pci} &= d + (e)SG_C - (f)SG_C^2 \end{aligned} \quad \text{where:}$$

| Condensate Fluids | Misc. Gases |
|-------------------|-------------|
| $a = 187$         | $a = 168$   |
| $b = 330$         | $b = 325$   |
| $c = 71.5$        | $c = 12.5$  |
| $d = 706$         | $d = 677$   |
| $e = 51.7$        | $e = 15.0$  |
| $f = 11.1$        | $f = 37.5$  |

If gases do not contain  $N_2$ ,  $H_2S$  or  $CO_2$  then  $SG_C = SG$ .  $T_{pc} = T_{pci}$  and  $P_{pc} = P_{pci}$

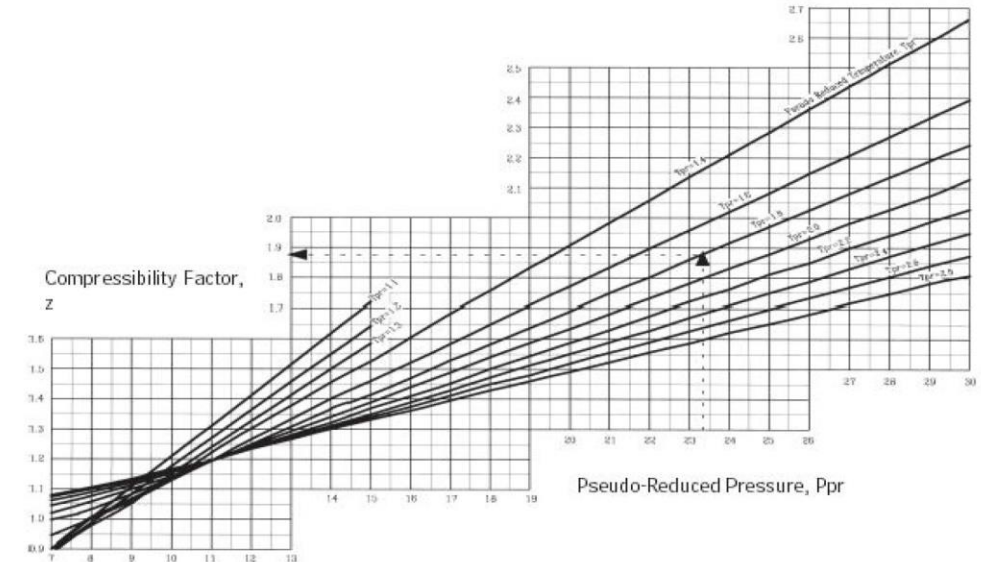
If the gases contain **IL** HS or  $CO_2$ , the adjusted specific gravity ( $SG_C$ ) is calculated:  
 $SG_C = SG - 0.9672Y_{N_2} - 1.5195Y_{CO_2} - 1.1765Y_{H_2S}$

where  $Y$  is the molar percent of each gas expressed as a decimal.

$T_{pc}$  and  $P_{pc}$  are adjusted using the Wichert-Aziz correction (WAC).

$$\begin{aligned} WAC &= 120[(Y_{CO_2} + Y_{H_2S})^{0.9} - (Y_{CO_2} + Y_{H_2S})^{1.6}] + 15(Y_{H_2S}^{0.5} - Y_{H_2S}^4) T_{pc}^* = \\ &= (1 - Y_{N_2} - Y_{CO_2} - Y_{H_2S}) T_{pci} + 2273Y_{N_2} + 547.6Y_{CO_2} + 672.4Y_{H_2S} P_{pc}^* = \\ &= (1 - Y_{N_2} - Y_{CO_2} - Y_{H_2S}) P_{pci} + 493Y_{N_2} + 1071Y_{CO_2} + 1306Y_{H_2S} \\ T_{pc} &= T_{pc} - WAC \\ P_{pc} &= [P_{pc} (T_{pc} - WAC)] / [T_{pc} + Y_{H_2S}(1 - Y_{H_2S})WAC] \end{aligned}$$

The adjustments are valid for these ranges:



Condensate fluids:  $0.56 < SG < 1.30$   
 Miscellaneous gases:  $0.56 < SG < 1.71$   
 Wichert-aziz correction:  $0 \leq \% CO_2 + \% H_2S < 80$

The pseudo-reduced temperature ( $T_{pr}$ ) and pressure ( $P_{pr}$ ) can be calculated from  $T_{pc}$ ,  $P_{pc}$ , average gas temperature  $T_{av}$  ( $^{\circ}F$ ) and pressure  $P_{av}$  (psi).  $T_{av}$  and  $P_{av}$  can be estimated from probable bottom hole conditions.

$$\begin{aligned} T_{av} &= [T_c + T_s + (T_g)(L)/100]/2 \\ P_{av} &= L(0.052m - 0.06) \quad \text{where:} \\ T_c &= \text{circulating temperature, } ^{\circ}F \\ T_s &= \text{surface temperature, } ^{\circ}F \\ T_g &= \text{temperature gradient, } ^{\circ}F/100 \text{ ft} \\ L &= \text{well depth, ft} \\ m &= \text{mud weight, ppg} \\ T_{pr} &= (460 + T_{av})/T_{pc} \\ P_{pr} &= (14.7 + P_{av})/P_{pc} \end{aligned}$$

Then  $z$  is found in the adjacent graph using the values for  $T_{pr}$  and  $P_{pr}$ .

The wellhead pressure ( $P_{wh}$ ) and gas gradient ( $g$ ) can be calculated:

$$\begin{aligned} P_{wh} &= P_{bh} e^{0.01875(SG)(L) / [z(460 + T_{av})]} \\ g &= (P_{bh} - P_{wh})/L \quad \text{where:} \\ P_{wh} &= \text{wellhead pressure, psi} \\ P_{bh} &= \text{bottom hole pressure, psi} \\ e &= \text{base of natural logarithm, 2.71} \\ SG &= \text{average specific gravity of gas} \\ L &= \text{well depth, ft} \\ T_{av} &= \text{average temperature, } ^{\circ}F \end{aligned}$$

**Example:**

|                             |   |
|-----------------------------|---|
| Well depth (true vertical)  | $L = 17800 \text{ ft}$                        |
| Gas specific gravity        | $SG = 0.65$                                   |
| Temperature gradient        | $T_g = 1.4 \text{ } ^{\circ}F/100 \text{ ft}$ |
| Surface temperature         | $T_s = 74 \text{ } ^{\circ}F$                 |
| Circulating temperature     | $T_c = 105 \text{ } ^{\circ}F$                |
| Mud weight at depth         | $m = 16.9 \text{ ppg}$                        |
| No $CO_2$ , $H_2S$ or $N_2$ |   |

1. Calculate  $T_{pc}$  and  $P_{pc}$  assuming misc. gases.  
 $T_{pc} = T_{pci} = 168 + (325)(0.65) - (12.5)(0.65)^2 = 374$   
 $P_{pc} = P_{pci} = 677 + (15.0)(0.65) - (37.5)(0.65)^2 = 671$
2. Calculate  $T_{av}$  and  $P_{av}$ :  
 $T_{av} = [105 + 74 + (1.4)(17800)/100]/2 = 214 \text{ } ^{\circ}F$   
 $P_{av} = 17800[(0.052)(16.9) - 0.06] = 14575 \text{ psi}$
3. Calculate  $T_{pr}$  and  $P_{pr}$ :  
 $T_{pr} = (460 + 214)/374 = 1.80$   
 $P_{pr} = (14.7 + 14575)/671 = 21.7$
4. From the graph,  $z$  equals 1.78.
5. Calculate  $P_{bh}$ , assuming it corresponds to the mud weight.  
 $P_{bh} = (0.052)(16.9)(17800) = 15643 \text{ psi}$
6. Calculate  $P_{wh}$ :  
 $P_{wh} = 15643 / e^{(0.01875)(0.65)(17800)/[(1.78)(214 + 460)]} = 13073 \text{ psi}$
7. Calculate  $g$ :  
 $g = (15643 - 13073)/17800 = 0.144 \text{ psi/ft}$

Note:  $P_{wh} = 10483 \text{ psi}$  and  $g = 0.290 \text{ psi/ft}$  using ideal gas law.





## WELLHEAD PRESSURE CALCULATION USING IDEAL GAS LAW

| Well<br>Depth<br>Feet | Average Specific Gravity of Gas Column |       |       |       |       |       |       |       |       |       |               |
|-----------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
|                       | 0.50                                   | 0.55  | 0.60  | 0.65  | 0.70  | 0.75  | 0.80  | 0.85  | 0.90  | 0.95  | 1.00<br>(Air) |
| 1000                  | 0.983                                  | 0.981 | 0.979 | 0.978 | 0.976 | 0.974 | 0.973 | 0.971 | 0.969 | 0.968 | 0.966         |
| 2000                  | 0.966                                  | 0.963 | 0.959 | 0.956 | 0.953 | 0.949 | 0.946 | 0.943 | 0.939 | 0.936 | 0.933         |
| 3000                  | 0.949                                  | 0.944 | 0.939 | 0.935 | 0.930 | 0.925 | 0.920 | 0.915 | 0.911 | 0.906 | 0.901         |
| 4000                  | 0.933                                  | 0.927 | 0.920 | 0.914 | 0.907 | 0.901 | 0.895 | 0.889 | 0.883 | 0.876 | 0.870         |
| 5000                  | 0.917                                  | 0.909 | 0.901 | 0.893 | 0.886 | 0.878 | 0.870 | 0.863 | 0.855 | 0.848 | 0.841         |
| 6000                  | 0.901                                  | 0.892 | 0.883 | 0.873 | 0.864 | 0.855 | 0.847 | 0.838 | 0.829 | 0.821 | 0.812         |
| 7000                  | 0.886                                  | 0.875 | 0.864 | 0.854 | 0.844 | 0.833 | 0.823 | 0.813 | 0.804 | 0.794 | 0.784         |
| 8000                  | 0.870                                  | 0.858 | 0.847 | 0.835 | 0.823 | 0.812 | 0.801 | 0.790 | 0.779 | 0.768 | 0.758         |
| 9000                  | 0.855                                  | 0.842 | 0.829 | 0.816 | 0.804 | 0.791 | 0.779 | 0.767 | 0.755 | 0.743 | 0.732         |
| 10000                 | 0.841                                  | 0.826 | 0.812 | 0.798 | 0.784 | 0.771 | 0.758 | 0.745 | 0.732 | 0.719 | 0.707         |
| 11000                 | 0.826                                  | 0.811 | 0.795 | 0.780 | 0.766 | 0.751 | 0.737 | 0.723 | 0.709 | 0.696 | 0.683         |
| 12000                 | 0.812                                  | 0.795 | 0.779 | 0.763 | 0.747 | 0.732 | 0.717 | 0.702 | 0.687 | 0.673 | 0.659         |
| 13000                 | 0.798                                  | 0.780 | 0.763 | 0.746 | 0.729 | 0.713 | 0.697 | 0.682 | 0.666 | 0.651 | 0.637         |

$$P_{wh}/P_{bh} = 1/e^{0.0000347 \cdot SG \cdot L}$$

where:

- $P_{wh}$  Wellhead pressure, psi.
- $P_{bh}$  Bottom hole pressure, psi.
- $e$  Base of natural logarithm, 2.71.
- $SG$  Average specific gravity of gas.
- $L$  Depth of well, ft.

| Well<br>Depth<br>Meters | Average Specific Gravity of Gas Column |       |       |       |       |       |       |       |       |       |               |
|-------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
|                         | 0.50                                   | 0.55  | 0.60  | 0.65  | 0.70  | 0.75  | 0.80  | 0.85  | 0.90  | 0.95  | 1.00<br>(Air) |
| 300                     | 0.983                                  | 0.981 | 0.980 | 0.978 | 0.976 | 0.975 | 0.973 | 0.971 | 0.970 | 0.968 | 0.967         |
| 600                     | 0.967                                  | 0.963 | 0.960 | 0.957 | 0.953 | 0.950 | 0.947 | 0.944 | 0.941 | 0.937 | 0.934         |
| 900                     | 0.950                                  | 0.945 | 0.941 | 0.936 | 0.931 | 0.926 | 0.921 | 0.917 | 0.912 | 0.907 | 0.903         |
| 1200                    | 0.934                                  | 0.928 | 0.921 | 0.915 | 0.909 | 0.903 | 0.897 | 0.891 | 0.885 | 0.879 | 0.873         |
| 1500                    | 0.918                                  | 0.911 | 0.903 | 0.895 | 0.888 | 0.880 | 0.873 | 0.865 | 0.858 | 0.851 | 0.843         |
| 1800                    | 0.903                                  | 0.894 | 0.885 | 0.876 | 0.867 | 0.858 | 0.849 | 0.841 | 0.832 | 0.824 | 0.815         |
| 2100                    | 0.888                                  | 0.877 | 0.867 | 0.856 | 0.846 | 0.836 | 0.826 | 0.817 | 0.807 | 0.797 | 0.788         |
| 2400                    | 0.873                                  | 0.861 | 0.849 | 0.838 | 0.826 | 0.815 | 0.804 | 0.793 | 0.782 | 0.772 | 0.761         |
| 2700                    | 0.858                                  | 0.845 | 0.832 | 0.819 | 0.807 | 0.795 | 0.782 | 0.771 | 0.759 | 0.747 | 0.736         |
| 3000                    | 0.843                                  | 0.829 | 0.815 | 0.801 | 0.788 | 0.775 | 0.761 | 0.749 | 0.736 | 0.724 | 0.711         |
| 3300                    | 0.829                                  | 0.814 | 0.799 | 0.784 | 0.769 | 0.755 | 0.741 | 0.727 | 0.714 | 0.700 | 0.687         |
| 3600                    | 0.815                                  | 0.799 | 0.782 | 0.767 | 0.751 | 0.736 | 0.721 | 0.706 | 0.692 | 0.678 | 0.664         |
| 3900                    | 0.801                                  | 0.784 | 0.767 | 0.750 | 0.733 | 0.717 | 0.702 | 0.686 | 0.671 | 0.657 | 0.642         |

$$P_{wh}/P_{bh} = 1/e^{0.0001139 \cdot SG \cdot L}$$

where:

- $P_{wh}$  = Wellhead pressure, MPa.
- $P_{bh}$  = Bottom hole pressure, MPa.
- $e$  = Base of natural logarithm, 2.71
- $SG$  = Average specific gravity of gas.
- $L$  = Depth of well, m.



## FLUID PRESSURE GRADIENTS AND BUOYANCY FACTORS

| Fluid Weight |       | Pressure Gradient |         | Buoyancy | Fluid Weight |       | Pressure Gradient |         | Buoyancy | Fluid Weight |       | Pressure Gradient |         | Buoyancy |
|--------------|-------|-------------------|---------|----------|--------------|-------|-------------------|---------|----------|--------------|-------|-------------------|---------|----------|
| lbs/gal      | kg/l  | psi/ft            | MPa/m   | Factor   | lbs/gal      | kg/l  | psi/ft            | MPa/m   | Factor   | lbs/gal      | kg/l  | psi/ft            | MPa/m   | Factor   |
| 5.0          | 0.599 | 0.260             | 0.00588 | 0.924    | 10.0         | 1.198 | 0.519             | 0.01174 | 0.847    | 15.0         | 1.797 | 0.779             | 0.01763 | 0.771    |
| 5.1          | 0.611 | 0.265             | 0.00600 | 0.922    | 10.1         | 1.210 | 0.524             | 0.01186 | 0.845    | 15.1         | 1.809 | 0.784             | 0.01774 | 0.769    |
| 5.2          | 0.623 | 0.270             | 0.00611 | 0.920    | 10.2         | 1.222 | 0.529             | 0.01197 | 0.844    | 15.2         | 1.821 | 0.789             | 0.01785 | 0.767    |
| 5.3          | 0.635 | 0.275             | 0.00622 | 0.919    | 10.3         | 1.234 | 0.535             | 0.01211 | 0.842    | 15.3         | 1.833 | 0.794             | 0.01797 | 0.766    |
| 5.4          | 0.647 | 0.280             | 0.00634 | 0.917    | 10.4         | 1.246 | 0.540             | 0.01222 | 0.841    | 15.4         | 1.845 | 0.799             | 0.01808 | 0.764    |
| 5.5          | 0.659 | 0.285             | 0.00645 | 0.916    | 10.5         | 1.258 | 0.545             | 0.01233 | 0.839    | 15.5         | 1.857 | 0.804             | 0.01819 | 0.763    |
| 5.6          | 0.671 | 0.291             | 0.00659 | 0.914    | 10.6         | 1.270 | 0.550             | 0.01245 | 0.838    | 15.6         | 1.869 | 0.810             | 0.01833 | 0.761    |
| 5.7          | 0.683 | 0.296             | 0.00670 | 0.913    | 10.7         | 1.282 | 0.555             | 0.01256 | 0.836    | 15.7         | 1.881 | 0.815             | 0.01844 | 0.760    |
| 5.8          | 0.695 | 0.301             | 0.00681 | 0.911    | 10.8         | 1.294 | 0.561             | 0.01270 | 0.835    | 15.8         | 1.893 | 0.820             | 0.01856 | 0.758    |
| 5.9          | 0.707 | 0.306             | 0.00692 | 0.910    | 10.9         | 1.306 | 0.566             | 0.01281 | 0.833    | 15.9         | 1.905 | 0.825             | 0.01867 | 0.757    |
| 6.0          | 0.719 | 0.311             | 0.00704 | 0.908    | 11.0         | 1.318 | 0.571             | 0.01292 | 0.832    | 16.0         | 1.917 | 0.830             | 0.01878 | 0.755    |
| 6.1          | 0.731 | 0.317             | 0.00717 | 0.907    | 11.1         | 1.330 | 0.576             | 0.01303 | 0.830    | 16.1         | 1.929 | 0.836             | 0.01892 | 0.754    |
| 6.2          | 0.743 | 0.322             | 0.00729 | 0.905    | 11.2         | 1.342 | 0.581             | 0.01315 | 0.829    | 16.2         | 1.941 | 0.842             | 0.01905 | 0.752    |
| 6.3          | 0.755 | 0.327             | 0.00740 | 0.904    | 11.3         | 1.354 | 0.586             | 0.01326 | 0.827    | 16.3         | 1.953 | 0.846             | 0.01914 | 0.751    |
| 6.4          | 0.767 | 0.332             | 0.00751 | 0.902    | 11.4         | 1.366 | 0.592             | 0.01340 | 0.826    | 16.4         | 1.965 | 0.851             | 0.01926 | 0.749    |
| 6.5          | 0.779 | 0.337             | 0.00763 | 0.901    | 11.5         | 1.378 | 0.597             | 0.01351 | 0.824    | 16.5         | 1.977 | 0.856             | 0.01937 | 0.748    |
| 6.6          | 0.791 | 0.343             | 0.00776 | 0.899    | 11.6         | 1.390 | 0.602             | 0.01362 | 0.823    | 16.6         | 1.989 | 0.862             | 0.01951 | 0.746    |
| 6.7          | 0.803 | 0.348             | 0.00787 | 0.898    | 11.7         | 1.402 | 0.607             | 0.01374 | 0.821    | 16.7         | 2.001 | 0.867             | 0.01962 | 0.745    |
| 6.8          | 0.815 | 0.353             | 0.00799 | 0.896    | 11.8         | 1.414 | 0.612             | 0.01385 | 0.819    | 16.8         | 2.013 | 0.872             | 0.01973 | 0.743    |
| 6.9          | 0.827 | 0.358             | 0.00810 | 0.894    | 11.9         | 1.426 | 0.618             | 0.01398 | 0.818    | 16.9         | 2.024 | 0.877             | 0.01985 | 0.741    |
| 7.0          | 0.839 | 0.363             | 0.00821 | 0.893    | 12.0         | 1.438 | 0.623             | 0.01410 | 0.816    | 17.0         | 2.036 | 0.882             | 0.01996 | 0.740    |
| 7.1          | 0.851 | 0.368             | 0.00833 | 0.891    | 12.1         | 1.449 | 0.628             | 0.01421 | 0.815    | 17.1         | 2.048 | 0.887             | 0.02007 | 0.738    |
| 7.2          | 0.863 | 0.374             | 0.00846 | 0.890    | 12.2         | 1.461 | 0.633             | 0.01432 | 0.813    | 17.2         | 2.060 | 0.893             | 0.02021 | 0.737    |
| 7.3          | 0.874 | 0.379             | 0.00858 | 0.888    | 12.3         | 1.473 | 0.638             | 0.01444 | 0.812    | 17.3         | 2.072 | 0.898             | 0.02032 | 0.735    |
| 7.4          | 0.886 | 0.384             | 0.00869 | 0.887    | 12.4         | 1.485 | 0.644             | 0.01457 | 0.810    | 17.4         | 2.084 | 0.903             | 0.02043 | 0.734    |
| 7.5          | 0.898 | 0.389             | 0.00880 | 0.885    | 12.5         | 1.497 | 0.649             | 0.01469 | 0.809    | 17.5         | 2.096 | 0.908             | 0.02055 | 0.732    |
| 7.6          | 0.910 | 0.394             | 0.00892 | 0.884    | 12.6         | 1.509 | 0.654             | 0.01480 | 0.807    | 17.6         | 2.108 | 0.913             | 0.02066 | 0.731    |
| 7.7          | 0.922 | 0.400             | 0.00905 | 0.882    | 12.7         | 1.521 | 0.659             | 0.01491 | 0.806    | 17.7         | 2.120 | 0.919             | 0.02080 | 0.729    |
| 7.8          | 0.934 | 0.405             | 0.00916 | 0.881    | 12.8         | 1.533 | 0.664             | 0.01503 | 0.804    | 17.8         | 2.132 | 0.924             | 0.02091 | 0.728    |
| 7.9          | 0.946 | 0.410             | 0.00928 | 0.879    | 12.9         | 1.545 | 0.670             | 0.01516 | 0.803    | 17.9         | 2.144 | 0.929             | 0.02102 | 0.726    |
| 8.0          | 0.958 | 0.415             | 0.00939 | 0.878    | 13.0         | 1.557 | 0.675             | 0.01527 | 0.801    | 18.0         | 2.156 | 0.934             | 0.02114 | 0.725    |
| 8.1          | 0.970 | 0.420             | 0.00950 | 0.876    | 13.1         | 1.569 | 0.680             | 0.01539 | 0.800    | 18.1         | 2.168 | 0.939             | 0.02125 | 0.723    |
| 8.2          | 0.982 | 0.426             | 0.00964 | 0.875    | 13.2         | 1.581 | 0.685             | 0.01550 | 0.798    | 18.2         | 2.180 | 0.945             | 0.02138 | 0.722    |
| 8.34         | 0.999 | 0.433             | 0.00980 | 0.873    | 13.3         | 1.593 | 0.690             | 0.01561 | 0.797    | 18.3         | 2.192 | 0.950             | 0.02150 | 0.720    |
| 8.4          | 1.006 | 0.436             | 0.00987 | 0.871    | 13.4         | 1.605 | 0.695             | 0.01573 | 0.795    | 18.4         | 2.204 | 0.955             | 0.02161 | 0.719    |
| 8.5          | 1.018 | 0.441             | 0.00998 | 0.870    | 13.5         | 1.617 | 0.701             | 0.01586 | 0.793    | 18.5         | 2.216 | 0.960             | 0.02172 | 0.717    |
| 8.6          | 1.030 | 0.446             | 0.01009 | 0.868    | 13.6         | 1.629 | 0.706             | 0.01598 | 0.792    | 18.6         | 2.228 | 0.965             | 0.02184 | 0.715    |
| 8.7          | 1.042 | 0.452             | 0.01023 | 0.867    | 13.7         | 1.641 | 0.711             | 0.01609 | 0.790    | 18.7         | 2.240 | 0.971             | 0.02197 | 0.714    |
| 8.8          | 1.054 | 0.457             | 0.01034 | 0.865    | 13.8         | 1.653 | 0.716             | 0.01620 | 0.789    | 18.8         | 2.252 | 0.976             | 0.02209 | 0.712    |
| 8.9          | 1.066 | 0.462             | 0.01045 | 0.864    | 13.9         | 1.665 | 0.721             | 0.01632 | 0.787    | 18.9         | 2.264 | 0.981             | 0.02220 | 0.711    |
| 9.0          | 1.078 | 0.467             | 0.01057 | 0.862    | 14.0         | 1.677 | 0.727             | 0.01645 | 0.786    | 19.0         | 2.276 | 0.986             | 0.02231 | 0.709    |
| 9.1          | 1.090 | 0.472             | 0.01068 | 0.861    | 14.1         | 1.689 | 0.732             | 0.01656 | 0.784    | 19.1         | 2.288 | 0.991             | 0.02243 | 0.708    |
| 9.2          | 1.102 | 0.477             | 0.01079 | 0.859    | 14.2         | 1.701 | 0.737             | 0.01668 | 0.783    | 19.2         | 2.300 | 0.996             | 0.02254 | 0.706    |
| 9.3          | 1.114 | 0.483             | 0.01093 | 0.858    | 14.3         | 1.713 | 0.742             | 0.01679 | 0.781    | 19.3         | 2.312 | 1.002             | 0.02267 | 0.705    |
| 9.4          | 1.126 | 0.488             | 0.01104 | 0.856    | 14.4         | 1.725 | 0.747             | 0.01690 | 0.780    | 19.4         | 2.324 | 1.007             | 0.02279 | 0.703    |
| 9.5          | 1.138 | 0.493             | 0.01116 | 0.855    | 14.5         | 1.737 | 0.753             | 0.01704 | 0.778    | 19.5         | 2.336 | 1.012             | 0.02290 | 0.702    |
| 9.625        | 1.153 | 0.500             | 0.01131 | 0.853    | 14.6         | 1.749 | 0.758             | 0.01715 | 0.777    | 19.6         | 2.348 | 1.017             | 0.02301 | 0.700    |
| 9.7          | 1.162 | 0.503             | 0.01138 | 0.852    | 14.7         | 1.761 | 0.763             | 0.01727 | 0.775    | 19.7         | 2.360 | 1.022             | 0.02313 | 0.699    |
| 9.8          | 1.174 | 0.509             | 0.01152 | 0.850    | 14.8         | 1.773 | 0.768             | 0.01738 | 0.774    | 19.8         | 2.372 | 1.028             | 0.02326 | 0.697    |
| 9.9          | 1.186 | 0.514             | 0.01163 | 0.849    | 14.9         | 1.785 | 0.773             | 0.01749 | 0.772    | 19.9         | 2.384 | 1.033             | 0.02338 | 0.696    |



## METRIC CONVERSIONS

### INSIDE AND OUTSIDE DIAMETERS

The US customary values for outside and inside diameters of pipe and outside diameters of couplings are converted:

$$D_m = 25.4 \times D$$

where:

$$D_m = \text{SI diameter, mm}$$

$$D = \text{diameter, in}$$

The SI outside and inside diameters of pipe and couplings with a specified outside diameter of 6.625 in. (168.28 mm) OD and smaller are rounded to the nearest 0.01 mm, and the SI outside and inside diameters of pipe and outside diameter of couplings with a specified outside diameter larger than 6.625 in. (168.28 mm) OD are rounded to the nearest 0.1 mm.

### WALL THICKNESS

The US customary values for wall thicknesses are converted:

$$t_m = 25.4 \times t$$

where:

$$t_m = \text{metric wall thickness, mm}$$

$$t = \text{wall thickness, in.}$$

The SI wall thicknesses are rounded to the nearest 0.01mm.

### DRIFT DIAMETER

The drift diameter is calculated (not converted):

$$dd_m = 25.4 \times d - dc_m$$

where:

$$dd_m = \text{drift diameter, mm}$$

$$d = \text{inside diameter, in}$$

$$dc_m = \text{drift constants, mm, See API 5CT (Metric)Table 5.1}$$

The SI drift diameter is rounded to the nearest 0.01 mm.

The US customary values for Lone Star Steel (LSS) drift diameters and the API drift diameters specified by the purchase order per API 5CT Table 6.0 are converted to SI values using the following formula:

$$dds_m = 25.4 \times dds$$

where:  $dds$  = drift diameter, in

This SI drift diameter is also rounded to the nearest 0.01 mm.

### PLAIN END LINEAR DENSITY

The plain end linear density can be calculated (not converted):

$$P_1 = 0.0246615 (D_m - t_m) t_m$$

where:

$$P_1 = \text{metric plain end mass/meter, kg/m.}$$

$$D_m = \text{metric outside diameter, mm.}$$

$$t_m = \text{metric wall thickness, mm.}$$

The SI plain end linear density is rounded to the nearest 0.01 kg/m.

### YIELD AND TENSILE STRENGTH

The US customary values for yield strength and tensile strength are converted to SI values using the following formula:

$$y_{s_m} = 0.00689476 \times y_s$$

$$t_{s_m} = 0.00689476 \times t_s$$

where:

$$y_{s_m} = \text{yield strength, N/mm}^2$$

$$y_s = \text{yield strength, psi}$$

$$t_{s_m} = \text{tensile strength, N/mm}^2$$

$$t_s = \text{tensile strength, psi}$$

The SI strengths are rounded to the nearest 1 N/mm<sup>2</sup>.

### CONVERSION FACTORS

| US Customary     | Multiplier              |                         | SI/Metric       |
|------------------|-------------------------|-------------------------|-----------------|
|                  | to Convert              | to Convert              |                 |
| in.              | 25.4                    | 0.03937                 | mm              |
| ft.              | 0.3048                  | 3.281                   | m               |
| in. <sup>2</sup> | 645.16                  | 0.00155                 | mm <sup>2</sup> |
| lbs              | 0.45359                 | 2.2046                  | kg              |
| lbs/ft           | 1.4882                  | 0.67197                 | kg/m            |
| psi              | 6.8948                  | 0.145026                | kPa             |
| psi              | 0.00689476              | 145.0368                | MPa             |
| ft-lb            | 1.3558                  | 0.73594                 | Joules (J)      |
| °F               | $\frac{5}{9} (°F - 32)$ | $32 + (\frac{9}{5} °C)$ | °C              |
| in. <sup>3</sup> | 16387                   | 0.00006102              | mm <sup>3</sup> |
| ft <sup>3</sup>  | 0.028317                | 35.314                  | m <sup>3</sup>  |
| gallons          | 3.7854                  | 0.26417                 | L               |
| gallons          | 0.003785                | 264.2                   | m <sup>3</sup>  |
| lb/gal           | 0.1199                  | 8.344                   | kg/L            |
| psi/ft           | 0.02262                 | 44.207                  | MPa/m           |
| ton              | 0.9072                  | 1.102                   | tonne           |
| \$/ton           | 1.102                   | 0.9072                  | \$/tonne        |