

## TUBERÍA POLIETILENO DE ALTA DENSIDAD

### TUBERÍAS POLIETILENO DE ALTA DENSIDAD (HDPE/ PEAD)

Usos: Minería, Industria, Sanitario, Acuicola, Agrícola.

Para conducción de agua potable, se utiliza tubería coextruida (líneas azules).

Rango de diámetros: 20 - 630 mm.

Persión de Operación: Ver tablas dimensionales al reverso (agua a 20°C)

Rango de Temperatura: 0° - 40 °C. Para temperaturas mayores a 20°C, se deben aplicar coeficientes de reducción de presión de operación.

Resinas utilizadas: Ver tablas 1 y 2 (valores referenciales).



PE 100 (tabla 1)

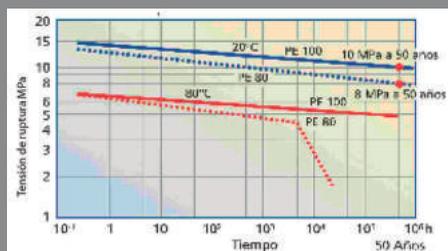
| Propiedad                          | Método de prueba | Valor típico | Unidad            |
|------------------------------------|------------------|--------------|-------------------|
| Densidad (resina base)             | ISO 1183         | 949          | Kg/m <sup>3</sup> |
| Densidad (compuesto)               | ISO 1183         | 959          | Kg/m <sup>3</sup> |
| Índice de fluidez (190°C/5Kg)      | ISO 1133         | 0,45         | g/10 min.         |
| Tensión máxima elástica            | ISO 6259         | 25           | MPa               |
| Alargamiento a la rotura           | ISO 6259         | >600         | %                 |
| Módulo de elasticidad              | ISO 527          | 1400         | MPa               |
| Tª de reblandecimiento Vicat (1Kg) | ISO 306          | 127          | °C                |
| Tª de reblandecimiento Vicat (5Kg) | ISO 306          | 77           | °C                |
| Estabilidad térmica (OIT1), 210°C) | ISO 10837        | >20          | min.              |
| ESCR (10% Igepal), F50             | ASTM D 1693-A    | >10000       | h                 |
| Contenido de negro de humo         | ASTM D 1603      | ≥2           | %                 |

1) OIT: oxidation induction time

PE 80 (tabla 2)

| Propiedad                          | Método de prueba | Valor típico | Unidad            |
|------------------------------------|------------------|--------------|-------------------|
| Densidad (resina base)             | ISO 1183         | 945          | Kg/m <sup>3</sup> |
| Densidad (compuesto)               | ISO 1183         | 955          | Kg/m <sup>3</sup> |
| Índice de fluidez (190°C/5Kg)      | ISO 1133         | 0,85         | g/10 min          |
| Tensión máxima elástica            | ISO 6259         | 21           | MPa               |
| Alargamiento a la rotura           | ISO 6259         | >600         | %                 |
| Módulo de elasticidad              | ISO 527          | 1000         | MPa               |
| Tª de reblandecimiento Vicat (1Kg) | ISO 306          | 125          | °C                |
| Tª de reblandecimiento Vicat (5Kg) | ISO 306          | 72           | °C                |
| Estabilidad térmica (OIT1), 210°C) | ISO 10837        | >20          | min               |
| ESCR (10% Igepal), F50             | ASTM D 1693-A    | >10000       | h                 |
| Contenido de negro de humo         | ASTM D 1603      | ≥2           | %                 |

1) OIT: oxidation induction time



#### Designación y Clasificación:

MRS (Minimum Required Strength): es el nivel de resistencia (tensión) mínima requerida que se debe considerar en el diseño de las tuberías para la conducción de agua a 20°C por un tiempo de servicio de al menos 50 años.

| Materiales | MRS    |
|------------|--------|
| PE 80      | 8 MPa  |
| PE 100     | 10 MPa |

Normas utilizadas

Certificaciones:

ISO 4427, DIN 8074, NCh 398/1. Certificación Permanente Cesmec, ISO 14001 e ISO 9001, OHSAS 18001

Sistemas de unión - fijas:

Soldadura de tope (termofusión y electro fusión).

Desmontables:

Uniones enflechadas y roscados de compresión.

#### Suministro estándar:

| Diámetro Nominal          | Rollos | Tiras | Tiras |
|---------------------------|--------|-------|-------|
| 20 - 63 mm ("1/2 - 1")    | 100 m  | 12 m  |       |
| 75 - 110 mm ("2 1/2 - 4") | 50 m   | 12 m  | 18 m  |
| 125 - 630 ("5 - 48")      |        | 12 m  | 18 m  |

# TUBERÍAS DE POLIETILENO ALTA DENSIDAD

## PE100 ISO 4427:

(Tensión de diseño 80 Kg/cm<sup>2</sup>)

| DIAMETRO NOM. |             | ESPESOR   |        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |
|---------------|-------------|-----------|--------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------|--------|------|---------|------|---------|------|--------|
|               |             | Serie S   |        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |
|               |             | 20        | 12.5   | 10                     | 8                      | 6.3                    | 5                      | 4                      | 3.2                    |      |        |      |         |      |         |      |        |
|               |             | Serie SDR |        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |
|               |             | 41        | 26     | 21                     | 17                     | 13.6                   | 11                     | 9                      | 7.4                    |      |        |      |         |      |         |      |        |
|               |             | Serie PN  |        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |
|               |             | 4         | 6      | 8                      | 10                     | 12.5                   | 16                     | 20                     | 25                     |      |        |      |         |      |         |      |        |
| D             | equivalente | mm        |        | MIN. Kg/m <sup>2</sup> |                        | MIN. Kg/m <sup>2</sup> |                        | MIN. Kg/m <sup>2</sup> |                        |      |        |      |         |      |         |      |        |
|               |             | mm        | pul.   | MIN. Kg/m <sup>2</sup> |      |        |      |         |      |         |      |        |
| 20            | 1/2         | —         | —      | —                      | —                      | —                      | —                      | 20                     | 0.117                  | 2.3  | 0.133  | 3.0  | 0.163   |      |         |      |        |
| 25            | 3/4         | —         | —      | —                      | —                      | —                      | —                      | 20                     | 0.149                  | 2.3  | 0.171  | 3.0  | 0.212   | 3.5  | 0.242   |      |        |
| 32            | 1           | —         | —      | —                      | —                      | —                      | —                      | 20                     | 0.194                  | 2.4  | 0.231  | 3.0  | 0.279   | 3.6  | 0.328   | 4.4  | 0.389  |
| 40            | 1 1/4       | —         | —      | —                      | —                      | 20                     | 0.246                  | 2.4                    | 0.295                  | 3.0  | 0.362  | 3.7  | 0.431   | 4.5  | 0.512   | 5.5  | 0.625  |
| 50            | 1 1/2       | —         | —      | 20                     | 0.311                  | 2.4                    | 0.373                  | 3.0                    | 0.453                  | 3.7  | 0.550  | 4.6  | 0.669   | 5.6  | 0.793   | 6.9  | 0.944  |
| 63            | 2           | —         | —      | 25                     | 0.492                  | 3.0                    | 0.578                  | 3.8                    | 0.722                  | 4.7  | 0.877  | 5.8  | 1.057   | 7.1  | 1.266   | 8.6  | 1.483  |
| 75            | 2 1/2       | 20        | 0.474  | 29                     | 0.674                  | 3.6                    | 0.828                  | 4.5                    | 1.019                  | 5.6  | 1.242  | 6.8  | 1.476   | 8.4  | 1.779   | 10.3 | 2.113  |
| 90            | 3           | 2.2       | 0.636  | 3.5                    | 0.978                  | 4.3                    | 1.188                  | 5.4                    | 1.465                  | 6.7  | 1.780  | 8.2  | 2.139   | 10.1 | 2.566   | 12.3 | 3.028  |
| 110           | 4           | 2.7       | 0.939  | 4.2                    | 1.435                  | 5.3                    | 1.782                  | 6.6                    | 2.180                  | 8.1  | 2.636  | 10.0 | 3.172   | 12.3 | 3.813   | 15.1 | 4.536  |
| 125           | 5           | 3.1       | 1.232  | 4.8                    | 1.848                  | 6.0                    | 2.278                  | 7.4                    | 2.780                  | 9.2  | 3.397  | 11.4 | 4.115   | 14.0 | 4.932   | 17.1 | 5.838  |
| 140           | 5 1/2       | 3.5       | 1.544  | 5.4                    | 2.333                  | 6.7                    | 2.852                  | 8.3                    | 3.490                  | 10.3 | 4.254  | 12.7 | 5.129   | 15.7 | 6.178   | 19.2 | 7.333  |
| 160           | 6           | 4.0       | 2.024  | 6.2                    | 3.060                  | 7.7                    | 3.741                  | 9.5                    | 4.555                  | 11.8 | 5.553  | 14.6 | 6.732   | 17.9 | 8.044   | 21.9 | 9.545  |
| 180           | 6           | 4.4       | 2.490  | 6.9                    | 3.810                  | 8.6                    | 4.701                  | 10.7                   | 5.762                  | 13.3 | 7.048  | 16.4 | 8.509   | 20.1 | 10.178  | 24.6 | 12.068 |
| 200           | 8           | 4.9       | 3.061  | 7.7                    | 4.725                  | 9.6                    | 5.824                  | 11.9                   | 7.110                  | 14.7 | 8.644  | 18.2 | 10.493  | 22.4 | 12.585  | 27.4 | 14.928 |
| 225           | 8           | 5.5       | 3.875  | 8.6                    | 5.938                  | 10.8                   | 7.360                  | 13.4                   | 9.019                  | 16.6 | 10.977 | 20.5 | 13.262  | 25.2 | 15.930  | 30.8 | 18.869 |
| 250           | 10          | 6.2       | 4.855  | 9.6                    | 7.358                  | 11.9                   | 9.006                  | 14.8                   | 11.052                 | 18.4 | 13.522 | 22.7 | 16.335  | 27.9 | 19.577  | 34.2 | 23.292 |
| 280           | 10          | 6.9       | 6.016  | 10.7                   | 9.177                  | 13.4                   | 11.370                 | 16.6                   | 13.885                 | 20.6 | 16.943 | 25.4 | 20.478  | 31.3 | 24.609  | 38.3 | 29.207 |
| 315           | 12          | 7.7       | 7.558  | 12.1                   | 11.691                 | 15.0                   | 14.288                 | 18.7                   | 17.583                 | 23.2 | 21.473 | 28.6 | 25.922  | 35.2 | 31.132  | 43.1 | 36.972 |
| 355           | 14          | 8.7       | 9.615  | 13.6                   | 14.775                 | 16.9                   | 18.142                 | 21.1                   | 22.380                 | 26.1 | 27.225 | 32.2 | 32.907  | 39.7 | 39.540  | 48.5 | 46.879 |
| 400           | 16          | 9.8       | 12.188 | 15.3                   | 18.735                 | 19.1                   | 23.133                 | 23.7                   | 28.282                 | 29.4 | 34.524 | 36.3 | 41.777  | 44.7 | 50.155  | 54.7 | 59.541 |
| 450           | 18          | 11.0      | 15.369 | 17.2                   | 23.688                 | 21.5                   | 29.254                 | 26.7                   | 35.832                 | 33.1 | 43.731 | 40.9 | 52.902  | 50.3 | 63.504  | 61.5 | 75.320 |
| 500           | 20          | 12.3      | 19.133 | 19.1                   | 29.222                 | 23.9                   | 36.094                 | 29.7                   | 44.274                 | 36.8 | 53.960 | 45.4 | 65.277  | 55.8 | 78.252  | —    | —      |
| 560           | 22          | 13.7      | 23.824 | 21.4                   | 36.629                 | 26.7                   | 45.174                 | 33.2                   | 55.465                 | 41.2 | 67.699 | 50.8 | 81.777  | 62.5 | 98.179  | —    | —      |
| 630           | 24          | 15.4      | 30.141 | 24.1                   | 46.412                 | 30.0                   | 57.065                 | 37.4                   | 70.249                 | 46.3 | 85.569 | 57.2 | 103.612 | 70.3 | 124.236 | —    | —      |



- (1) La relación dimensional estándar SDR corresponde al cociente entre el diámetro externo y el espesor de pared de la tubería. Es adimensional.  
 (2) Tubería se puede entregar negra o coextruida.  
 ■ Tubería se puede suministrar en rollos o en tiras.

## PE80 ISO 4427:

(Tensión de diseño 63 Kg/cm<sup>2</sup>)

| DIAMETRO NOM. |             | ESPESOR   |        |                        |                        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |      |        |
|---------------|-------------|-----------|--------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------|--------|------|---------|------|---------|------|--------|------|--------|
|               |             | Serie S   |        |                        |                        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |      |        |
|               |             | 20        | 16     | 12.5                   | 10                     | 8                      | 6.3                    | 5                      | 4                      | 3.2                    | 2.5                    |      |        |      |         |      |         |      |        |      |        |
|               |             | Serie SDR |        |                        |                        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |      |        |
|               |             | 41        | 33     | 26                     | 21                     | 17                     | 13.6                   | 11                     | 9                      | 7.4                    | 6                      |      |        |      |         |      |         |      |        |      |        |
|               |             | Serie PN  |        |                        |                        |                        |                        |                        |                        |                        |                        |      |        |      |         |      |         |      |        |      |        |
|               |             | 3.2       | 4      | 5                      | 6                      | 8                      | 10                     | 12.5                   | 16                     | 20                     | 25                     |      |        |      |         |      |         |      |        |      |        |
| D             | equivalente | mm        |        | MIN. Kg/m <sup>2</sup> |                        | MIN. Kg/m <sup>2</sup> |                        | MIN. Kg/m <sup>2</sup> |                        | MIN. Kg/m <sup>2</sup> |                        |      |        |      |         |      |         |      |        |      |        |
|               |             | mm        | pul.   | MIN. Kg/m <sup>2</sup> |      |        |      |         |      |         |      |        |      |        |
| 20            | 1/2         | —         | —      | —                      | —                      | —                      | —                      | —                      | —                      | —                      | —                      |      |        |      |         |      |         |      |        |      |        |
| 25            | 3/4         | —         | —      | —                      | —                      | —                      | —                      | —                      | —                      | —                      | —                      |      |        |      |         |      |         |      |        |      |        |
| 32            | 1           | —         | —      | —                      | —                      | —                      | —                      | —                      | —                      | —                      | —                      |      |        |      |         |      |         |      |        |      |        |
| 40            | 1 1/4       | —         | —      | —                      | —                      | —                      | —                      | —                      | —                      | —                      | —                      |      |        |      |         |      |         |      |        |      |        |
| 50            | 1 1/2       | —         | —      | —                      | —                      | —                      | —                      | —                      | —                      | —                      | —                      |      |        |      |         |      |         |      |        |      |        |
| 63            | 2           | —         | —      | —                      | —                      | —                      | —                      | —                      | —                      | —                      | —                      |      |        |      |         |      |         |      |        |      |        |
| 75            | 2 1/2       | 20        | 0.472  | 2.3                    | 0.546                  | 2.9                    | 0.671                  | 3.4                    | 0.825                  | 4.5                    | 1.015                  | 5.4  | 1.297  | 6.8  | 1.471   | 8.4  | 1.772   | 10.3 | 2.104  | 12.5 | 2.777  |
| 90            | 3           | 2.2       | 0.633  | 2.8                    | 0.786                  | 3.5                    | 0.974                  | 4.3                    | 1.185                  | 5.4                    | 1.489                  | 6.7  | 1.772  | 8.2  | 2.130   | 10.1 | 2.555   | 12.3 | 3.015  | 15.1 | 3.694  |
| 110           | 4           | 2.7       | 0.935  | 3.4                    | 1.148                  | 4.2                    | 1.429                  | 5.3                    | 1.775                  | 6.6                    | 2.171                  | 8.1  | 2.625  | 10.0 | 3.155   | 12.3 | 3.797   | 15.1 | 4.517  | 19.0 | 4.694  |
| 125           | 5           | 3.1       | 1.227  | 3.9                    | 1.510                  | 4.8                    | 1.841                  | 6.0                    | 2.268                  | 7.4                    | 2.769                  | 9.2  | 3.393  | 11.4 | 4.098   | 14.0 | 4.911   | 17.1 | 5.813  | 19.3 | 6.144  |
| 140           | 5 1/2       | 3.5       | 1.538  | 4.3                    | 1.875                  | 5.4                    | 2.234                  | 6.7                    | 2.841                  | 8.3                    | 3.474                  | 10.3 | 4.297  | 12.7 | 5.108   | 15.7 | 6.192   | 19.2 | 7.320  | 20.8 | 7.789  |
| 160           | 6           | 4.0       | 2.015  | 4.9                    | 2.423                  | 6.2                    | 3.047                  | 7.7                    | 3.725                  | 9.5                    | 4.358                  | 11.8 | 5.530  | 14.6 | 6.704   | 17.9 | 8.011   | 21.9 | 9.305  | 23.3 | 10.019 |
| 180           | 6           | 4.4       | 2.480  | 5.5                    | 3.056                  | 6.9                    | 3.794                  | 8.6                    | 4.681                  | 10.7                   | 5.738                  | 13.3 | 7.019  | 16.4 | 8.473   | 20.1 | 10.135  | 24.6 | 12.017 | 26.6 | 12.815 |
| 200           | 8           | 4.9       | 3.048  | 6.2                    | 3.841                  | 7.7                    | 4.706                  | 9.6                    | 5.800                  | 11.9                   | 7.081                  | 14.7 | 8.608  | 18.2 | 10.449  | 22.4 | 12.533  | 27.4 | 14.866 | 29.9 | 15.961 |
| 225           | 8           | 5.5       | 3.889  | 6.9                    | 4.783                  | 8.6                    | 5.914                  | 10.8                   | 7.330                  | 13.4                   | 8.981                  | 16.6 | 10.951 | 20.5 | 13.227  | 25.2 | 15.864  | 30.8 | 18.790 | 33.2 | 20.002 |
| 250           | 10          | 6.2       | 4.835  | 7.7                    | 5.927                  | 9.6                    | 7.327                  | 11.9                   | 8.969                  | 14.8                   | 11.026                 | 18.4 | 13.466 | 22.7 | 16.266  | 27.9 | 19.496  | 34.2 | 23.195 | 37.4 | 24.958 |
| 280           | 10          | 6.9       | 5.991  | 8.6                    | 7.419                  | 10.7                   | 9.138                  | 13.4                   | 11.322                 | 16.6                   | 13.827                 | 20.6 | 16.872 | 25.4 | 20.393  | 31.3 | 24.507  | 39.3 | 29.085 | 41.5 | 31.064 |
| 315           | 12          | 7.7       | 7.526  | 9.7                    | 9.401                  | 12.1                   | 11.642                 | 15.0                   | 14.228                 | 18.7                   | 17.510                 | 23.2 | 21.383 | 28.6 | 25.814  | 35.2 | 31.020  | 43.1 | 36.818 | 46.5 | 39.179 |
| 355           | 14          | 8.7       | 9.575  | 10.9                   | 11.800                 | 13.6                   | 14.713                 | 16.9                   | 18.067                 | 21.1                   | 22.286                 | 26.1 | 27.112 | 32.2 | 32.770  | 39.7 | 39.375  | 48.5 | 46.684 | 52.3 | 49.685 |
| 400           | 16          | 9.8       | 12.137 | 12.3                   | 15.181                 | 15.3                   | 18.657                 | 19.1                   | 23.038                 | 23.7                   | 28.164                 | 29.4 | 34.380 | 36.3 | 41.605  | 44.7 | 49.946  | 54.7 | 59.293 | 59.0 | 63.096 |
| 450           | 18          | 11.0      | 15.304 | 13.8                   | 19.068                 | 17.2                   | 23.990                 | 21.5                   | 29.132                 | 26.7                   | 35.883                 | 33.1 | 43.548 | 40.9 | 52.681  | 50.3 | 63.239  | 61.5 | 75.036 | —    | —      |
| 500           | 20          | 12.3      | 19.033 | 15.3                   | 23.517                 | 19.1                   | 29.100                 | 23.9                   | 35.943                 | 29.7                   | 44.089                 | 36.8 | 53.735 | 45.4 | 65.005  | 55.8 | 77.925  | —    | —      | —    | —      |
| 560           | 22          | 13.7      | 23.725 | 17.2                   | 29.599                 | 21.4                   | 36.476                 | 26.7                   | 44.986                 | 33.2                   | 55.234                 | 41.2 | 67.417 | 50.8 | 81.436  | 62.5 | 97.769  | —    | —      | —    | —      |
| 630           | 24          | 15.4      | 30.015 | 19.3                   | 37.338                 | 24.1                   | 46.219                 | 30.0                   | 56.827                 | 37.4                   | 69.556                 | 46.3 | 85.212 | 57.2 | 103.180 | 70.3 | 123.718 | —    | —      | —    | —      |

- (1) La relación dimensional estándar SDR corresponde al cociente entre el diámetro externo y el espesor de pared de la tubería. Es adimensional.  
 (2) Tubería se puede entregar negra o coextruida.  
 ■ Tubería se puede suministrar en rollos o en tiras.

## Tablas dimensionales Referenciales PE80 DIN 8074:

(Tensión de diseño 50 Kg/cm<sup>2</sup>)

| DIAMETRO nominal | DIAMETRO equivalente | RELACION DIMENSIONAL ESTANDAR SDR (1) |                 |                   |                 |                   |                 |                   |                 |                   |                 |                   |                 |         |      |     |      |     |      |
|------------------|----------------------|---------------------------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|---------|------|-----|------|-----|------|
|                  |                      | SDR 41                                |                 |                   | SDR 33          |                   |                 | SDR 22            |                 | SDR 17            |                 | SDR 11            |                 | SDR 7.4 |      |     |      |     |      |
| D                |                      | PRESION NOMINAL PN                    |                 |                   |                 |                   |                 |                   |                 |                   |                 |                   |                 |         |      |     |      |     |      |
|                  |                      | PN 2.5                                |                 | PN 3.2            |                 | PN 4              |                 | PN 6              |                 | PN 10             |                 | PN 16             |                 |         |      |     |      |     |      |
| mm               | pulgados             | espesor mínimo mm                     | peso medio kg/m | espesor mínimo mm | peso medio kg/m | espesor mínimo mm | peso medio kg/m | espesor mínimo mm | peso medio kg/m | espesor mínimo mm | peso medio kg/m | espesor mínimo mm | peso medio kg/m |         |      |     |      |     |      |
|                  |                      | 20                                    | 1/2             | —                 | —               | —                 | —               | —                 | —               | —                 | —               | —                 | —               | 1.9     | 0.11 | 2.6 | 0.16 |     |      |
| 25               | 3/4                  | —                                     | —               | —                 | —               | —                 | —               | —                 | —               | —                 | —               | 2.3               | 0.17            | 3.5     | 0.24 |     |      |     |      |
| 32               | 1                    | —                                     | —               | —                 | —               | —                 | —               | —                 | —               | —                 | —               | 1.9               | 0.19            | 2.9     | 0.27 | 4.4 | 0.39 |     |      |
| 40               | 1 1/4                | —                                     | —               | —                 | —               | —                 | —               | —                 | —               | —                 | —               | 2.3               | 0.29            | 3.7     | 0.43 | 5.5 | 0.61 |     |      |
| 50               | 1 1/2                | —                                     | —               | —                 | —               | —                 | —               | —                 | —               | 2.0               | 0.32            | 2.9               | 0.45            | 4.6     | 0.67 | 6.9 | 0.95 |     |      |
| 63               | 2                    | —                                     | —               | —                 | —               | —                 | —               | —                 | —               | 2.0               | 0.40            | 2.5               | 0.50            | 3.6     | 0.70 | 5.8 | 1.06 | 8.6 | 1.49 |
| 75               | 2 1/2                | 1.9                                   | 0.46            | 2.3               | 0.56            | 2.9               | 0.68            | 4.3               | 0.99            | 6.8               | 1.48            | 10.3              | 2.12            |         |      |     |      |     |      |
| 90               | 3                    | 2.2                                   | 0.65            | 2.8               | 0.80            | 3.5               | 0.99            | 5.1               | 1.40            | 8.2               | 2.14            | 12.3              | 3.03            |         |      |     |      |     |      |
| 110              | 4                    | 2.7                                   | 0.95            | 3.4               | 1.19            | 4.2               | 1.45            | 6.3               | 2.10            | 11.4              | 3.18            | 15.1              | 4.54            |         |      |     |      |     |      |
| 125              | 5                    | 3.1                                   | 1.25            | 3.9               | 1.53            | 4.8               | 1.86            | 7.1               | 2.69            | 11.0              | 4.12            | 17.1              | 5.84            |         |      |     |      |     |      |
| 140              | 5 1/2                | 3.5                                   | 1.56            | 4.3               | 1.90            | 5.4               | 2.35            | 8.0               | 3.37            | 12.7              | 5.13            | 19.2              | 7.33            |         |      |     |      |     |      |
| 160              | 6                    | 4.0                                   | 2.02            | 4.9               | 2.45            | 6.2               | 3.07            | 9.1               | 4.40            | 14.6              | 6.74            | 21.9              | 9.54            |         |      |     |      |     |      |
| 180              | 6                    | 4.4                                   | 2.48            | 5.5               | 3.10            | 6.9               | 3.83            | 10.2              | 5.53            | 16.4              | 8.51            | 24.6              | 12.06           |         |      |     |      |     |      |
| 200              | 8                    | 4.9                                   | 3.08            | 6.2               | 3.88            | 7.7               |                 |                   |                 |                   |                 |                   |                 |         |      |     |      |     |      |