

**TB****Carga Extra Pesada**

| Referência | Diam. Externo | Diam. Interno | Compr. Total (mm) | Constante Elástica |           | 16% do compr. total 1Milhão de ciclos |                 | 18% do compr. total 500mil ciclos |                 | 20% do compr. total 300mil ciclos |                 |
|------------|---------------|---------------|-------------------|--------------------|-----------|---------------------------------------|-----------------|-----------------------------------|-----------------|-----------------------------------|-----------------|
|            |               |               |                   | (N / mm)           | (Kgf /mm) | Deflexão                              | Carga           | Deflexão                          | Carga           | Deflexão                          | Carga           |
| TB 8 × 10  | 8             | 4             | 10                | 166.11             | { 16.94 } | 1.6                                   | 255<br>{ 26.0 } | 1.8                               | 299<br>{ 30.5 } | 2.0                               | 343<br>{ 35.0 } |
| 15         |               |               | 15                | 110.74             | { 11.29 } | 2.4                                   |                 | 2.7                               |                 | 3.0                               |                 |
| 20         |               |               | 20                | 83.06              | { 8.47 }  | 3.2                                   |                 | 3.6                               |                 | 4.0                               |                 |
| 25         |               |               | 25                | 66.44              | { 6.78 }  | 4.0                                   |                 | 4.5                               |                 | 5.0                               |                 |
| 30         |               |               | 30                | 55.37              | { 5.65 }  | 4.8                                   |                 | 5.4                               |                 | 6.0                               |                 |
| 35         |               |               | 35                | 47.46              | { 4.84 }  | 5.6                                   |                 | 6.3                               |                 | 7.0                               |                 |
| 40         |               |               | 40                | 41.53              | { 4.23 }  | 6.4                                   |                 | 7.2                               |                 | 8.0                               |                 |
| 45         |               |               | 45                | 36.91              | { 3.76 }  | 7.2                                   |                 | 8.1                               |                 | 9.0                               |                 |
| 50         |               |               | 50                | 33.22              | { 3.39 }  | 8.0                                   |                 | 9.0                               |                 | 10.0                              |                 |
| 55         |               |               | 55                | 30.20              | { 3.08 }  | 8.8                                   |                 | 9.9                               |                 | 11.0                              |                 |
| 60         |               |               | 60                | 27.69              | { 2.82 }  | 9.6                                   |                 | 10.8                              |                 | 12.0                              |                 |
| 65         |               |               | 65                | 25.56              | { 2.61 }  | 10.4                                  |                 | 11.7                              |                 | 13.0                              |                 |
| 70         |               |               | 70                | 23.73              | { 2.42 }  | 11.2                                  |                 | 12.6                              |                 | 14.0                              |                 |
| 75         |               |               | 75                | 22.15              | { 2.26 }  | 12.0                                  |                 | 13.5                              |                 | 15.0                              |                 |
| 80         |               |               | 80                | 20.76              | { 2.12 }  | 12.8                                  |                 | 14.4                              |                 | 16.0                              |                 |
| TB 10 × 20 | 10            | 5             | 20                | 111.67             | { 11.39 } | 3.2                                   | 353<br>{ 36.0 } | 3.6                               | 402<br>{ 41.0 } | 4.0                               | 441<br>{ 45.0 } |
| 25         |               |               | 25                | 89.33              | { 9.11 }  | 4.0                                   |                 | 4.5                               |                 | 5.0                               |                 |
| 30         |               |               | 30                | 74.44              | { 7.59 }  | 4.8                                   |                 | 5.4                               |                 | 6.0                               |                 |
| 35         |               |               | 35                | 63.81              | { 6.51 }  | 5.6                                   |                 | 6.3                               |                 | 7.0                               |                 |
| 40         |               |               | 40                | 55.83              | { 5.69 }  | 6.4                                   |                 | 7.2                               |                 | 8.0                               |                 |
| 45         |               |               | 45                | 49.63              | { 5.06 }  | 7.2                                   |                 | 8.1                               |                 | 9.0                               |                 |
| 50         |               |               | 50                | 44.67              | { 4.55 }  | 8.0                                   |                 | 9.0                               |                 | 10.0                              |                 |
| 55         |               |               | 55                | 40.61              | { 4.14 }  | 8.8                                   |                 | 9.9                               |                 | 11.0                              |                 |
| 60         |               |               | 60                | 37.22              | { 3.80 }  | 9.6                                   |                 | 10.8                              |                 | 12.0                              |                 |
| 65         |               |               | 65                | 34.36              | { 3.50 }  | 10.4                                  |                 | 11.7                              |                 | 13.0                              |                 |
| 70         |               |               | 70                | 31.90              | { 3.25 }  | 11.2                                  |                 | 12.6                              |                 | 14.0                              |                 |
| 75         |               |               | 75                | 29.78              | { 3.04 }  | 12.0                                  |                 | 13.5                              |                 | 15.0                              |                 |
| 80         |               |               | 80                | 27.92              | { 2.85 }  | 12.8                                  |                 | 14.4                              |                 | 16.0                              |                 |
| 90         |               |               | 90                | 24.81              | { 2.53 }  | 14.4                                  |                 | 16.2                              |                 | 18.0                              |                 |
| TB 12 × 20 |               |               | 12                | 6                  | 20        | 141.67                                |                 | { 14.45 }                         |                 | 3.2                               |                 |
| 25         | 25            | 113.33        |                   |                    | { 11.56 } | 4.0                                   | 4.5             | 5.0                               |                 |                                   |                 |
| 30         | 30            | 94.44         |                   |                    | { 9.63 }  | 4.8                                   | 5.4             | 6.0                               |                 |                                   |                 |
| 35         | 35            | 80.95         |                   |                    | { 8.25 }  | 5.6                                   | 6.3             | 7.0                               |                 |                                   |                 |
| 40         | 40            | 70.83         |                   |                    | { 7.22 }  | 6.4                                   | 7.2             | 8.0                               |                 |                                   |                 |
| 45         | 45            | 62.96         |                   |                    | { 6.42 }  | 7.2                                   | 8.1             | 9.0                               |                 |                                   |                 |
| 50         | 50            | 56.67         |                   |                    | { 5.78 }  | 8.0                                   | 9.0             | 10.0                              |                 |                                   |                 |
| 55         | 55            | 51.52         |                   |                    | { 5.25 }  | 8.8                                   | 9.9             | 11.0                              |                 |                                   |                 |
| 60         | 60            | 47.22         |                   |                    | { 4.82 }  | 9.6                                   | 10.8            | 12.0                              |                 |                                   |                 |
| 65         | 65            | 43.59         |                   |                    | { 4.44 }  | 10.4                                  | 11.7            | 13.0                              |                 |                                   |                 |
| 70         | 70            | 40.48         |                   |                    | { 4.13 }  | 11.2                                  | 12.6            | 14.0                              |                 |                                   |                 |
| 75         | 75            | 37.78         |                   |                    | { 3.85 }  | 12.0                                  | 13.5            | 15.0                              |                 |                                   |                 |
| 80         | 80            | 35.42         |                   |                    | { 3.61 }  | 12.8                                  | 14.4            | 16.0                              |                 |                                   |                 |
| 90         | 90            | 31.48         |                   |                    | { 3.21 }  | 14.4                                  | 16.2            | 18.0                              |                 |                                   |                 |

TB



## Carga Extra Pesada

| Referência | Diam. Externo | Diam. Interno | Compr. Total (mm) | Constante Elástica |           | 16% do compr. total 1Milhão de ciclos |                  | 18% do compr. total 500mil ciclos |                    | 20% do compr. total 300mil ciclos |                    |
|------------|---------------|---------------|-------------------|--------------------|-----------|---------------------------------------|------------------|-----------------------------------|--------------------|-----------------------------------|--------------------|
|            |               |               |                   | (N / mm)           | (Kgf /mm) | Deflexão                              | Carga            | Deflexão                          | Carga              | Deflexão                          | Carga              |
| TB 14 x 25 | 14            | 7             | 25                | 148.22             | { 15.11 } | 4.0                                   | 588<br>{ 60.0 }  | 4.5                               | 667<br>{ 68.0 }    | 5.0                               | 736<br>{ 75.1 }    |
| 30         |               |               | 30                | 123.52             | { 12.60 } | 4.8                                   |                  | 5.4                               |                    | 6.0                               |                    |
| 35         |               |               | 35                | 105.87             | { 10.80 } | 5.6                                   |                  | 6.3                               |                    | 7.0                               |                    |
| 40         |               |               | 40                | 92.64              | { 9.45 }  | 6.4                                   |                  | 7.2                               |                    | 8.0                               |                    |
| 45         |               |               | 45                | 82.35              | { 8.40 }  | 7.2                                   |                  | 8.1                               |                    | 9.0                               |                    |
| 50         |               |               | 50                | 74.11              | { 7.56 }  | 8.0                                   |                  | 9.0                               |                    | 10.0                              |                    |
| 55         |               |               | 55                | 67.37              | { 6.87 }  | 8.8                                   |                  | 9.9                               |                    | 11.0                              |                    |
| 60         |               |               | 60                | 61.76              | { 6.30 }  | 9.6                                   |                  | 10.8                              |                    | 12.0                              |                    |
| 65         |               |               | 65                | 57.01              | { 5.81 }  | 10.4                                  |                  | 11.7                              |                    | 13.0                              |                    |
| 70         |               |               | 70                | 52.94              | { 5.40 }  | 11.2                                  |                  | 12.6                              |                    | 14.0                              |                    |
| 75         |               |               | 75                | 49.41              | { 5.04 }  | 12.0                                  |                  | 13.5                              |                    | 15.0                              |                    |
| 80         |               |               | 80                | 46.32              | { 4.72 }  | 12.8                                  |                  | 14.4                              |                    | 16.0                              |                    |
| 90         |               |               | 90                | 41.17              | { 4.20 }  | 14.4                                  |                  | 16.2                              |                    | 18.0                              |                    |
| 100        |               |               | 100               | 37.06              | { 3.78 }  | 16.0                                  |                  | 18.0                              |                    | 20.0                              |                    |
| TB 16 x 25 | 16            | 8             | 25                | 196.22             | { 20.01 } | 4.0                                   | 785<br>{ 80.0 }  | 4.5                               | 883<br>{ 90.0 }    | 5.0                               | 981<br>{ 100.0 }   |
| 30         |               |               | 30                | 163.52             | { 16.67 } | 4.8                                   |                  | 5.4                               |                    | 6.0                               |                    |
| 35         |               |               | 35                | 140.16             | { 14.29 } | 5.6                                   |                  | 6.3                               |                    | 7.0                               |                    |
| 40         |               |               | 40                | 122.64             | { 12.51 } | 6.4                                   |                  | 7.2                               |                    | 8.0                               |                    |
| 45         |               |               | 45                | 109.01             | { 11.12 } | 7.2                                   |                  | 8.1                               |                    | 9.0                               |                    |
| 50         |               |               | 50                | 98.11              | { 10.00 } | 8.0                                   |                  | 9.0                               |                    | 10.0                              |                    |
| 55         |               |               | 55                | 89.19              | { 9.10 }  | 8.8                                   |                  | 9.9                               |                    | 11.0                              |                    |
| 60         |               |               | 60                | 81.76              | { 8.34 }  | 9.6                                   |                  | 10.8                              |                    | 12.0                              |                    |
| 65         |               |               | 65                | 75.47              | { 7.70 }  | 10.4                                  |                  | 11.7                              |                    | 13.0                              |                    |
| 70         |               |               | 70                | 70.08              | { 7.15 }  | 11.2                                  |                  | 12.6                              |                    | 14.0                              |                    |
| 75         |               |               | 75                | 65.41              | { 6.67 }  | 12.0                                  |                  | 13.5                              |                    | 15.0                              |                    |
| 80         |               |               | 80                | 61.32              | { 6.25 }  | 12.8                                  |                  | 14.4                              |                    | 16.0                              |                    |
| 90         |               |               | 90                | 54.51              | { 5.56 }  | 14.4                                  |                  | 16.2                              |                    | 18.0                              |                    |
| 100        |               |               | 100               | 49.06              | { 5.00 }  | 16.0                                  |                  | 18.0                              |                    | 20.0                              |                    |
| 125        | 125           | 39.24         | { 4.00 }          | 20.0               | 22.5      | 25.0                                  |                  |                                   |                    |                                   |                    |
| TB 18 x 25 | 18            | 9             | 25                | 246.22             | { 25.11 } | 4.0                                   | 981<br>{ 100.0 } | 4.5                               | 1,108<br>{ 113.0 } | 5.0                               | 1,226<br>{ 125.0 } |
| 30         |               |               | 30                | 205.19             | { 20.92 } | 4.8                                   |                  | 5.4                               |                    | 6.0                               |                    |
| 35         |               |               | 35                | 175.87             | { 17.93 } | 5.6                                   |                  | 6.3                               |                    | 7.0                               |                    |
| 40         |               |               | 40                | 153.89             | { 15.69 } | 6.4                                   |                  | 7.2                               |                    | 8.0                               |                    |
| 45         |               |               | 45                | 136.79             | { 13.95 } | 7.2                                   |                  | 8.1                               |                    | 9.0                               |                    |
| 50         |               |               | 50                | 123.11             | { 12.55 } | 8.0                                   |                  | 9.0                               |                    | 10.0                              |                    |
| 55         |               |               | 55                | 111.92             | { 11.41 } | 8.8                                   |                  | 9.9                               |                    | 11.0                              |                    |
| 60         |               |               | 60                | 102.59             | { 10.46 } | 9.6                                   |                  | 10.8                              |                    | 12.0                              |                    |
| 65         |               |               | 65                | 94.70              | { 9.66 }  | 10.4                                  |                  | 11.7                              |                    | 13.0                              |                    |
| 70         |               |               | 70                | 87.94              | { 8.97 }  | 11.2                                  |                  | 12.6                              |                    | 14.0                              |                    |
| 75         |               |               | 75                | 82.07              | { 8.37 }  | 12.0                                  |                  | 13.5                              |                    | 15.0                              |                    |
| 80         |               |               | 80                | 76.94              | { 7.85 }  | 12.8                                  |                  | 14.4                              |                    | 16.0                              |                    |
| 90         |               |               | 90                | 68.40              | { 6.97 }  | 14.4                                  |                  | 16.2                              |                    | 18.0                              |                    |
| 100        |               |               | 100               | 61.56              | { 6.28 }  | 16.0                                  |                  | 18.0                              |                    | 20.0                              |                    |
| 125        | 125           | 49.24         | { 5.02 }          | 20.0               | 22.5      | 25.0                                  |                  |                                   |                    |                                   |                    |





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|------------|---------------|---------------|-------------------|--------------------|-----------|---------------------------------------|------------------|-----------------------------------|------------------|-----------------------------------|------------------|
|            |               |               |                   | (N / mm)           | (Kgf /mm) | Deflexão                              | Carga            | Deflexão                          | Carga            | Deflexão                          | Carga            |
| TB 20 × 25 | 20            | 10            | 25                | 313.78             | 32.00     | 4.0                                   | 1,255<br>{128.0} | 4.5                               | 1,412<br>{144.0} | 5.0                               | 1,569<br>{160.0} |
| 30         |               |               | 30                | 261.48             | 26.66     | 4.8                                   |                  | 5.4                               |                  |                                   |                  |
| 35         |               |               | 35                | 224.13             | 22.85     | 5.6                                   |                  | 6.3                               |                  |                                   |                  |
| 40         |               |               | 40                | 196.11             | 20.00     | 6.4                                   |                  | 7.2                               |                  |                                   |                  |
| 45         |               |               | 45                | 174.32             | 17.78     | 7.2                                   |                  | 8.1                               |                  |                                   |                  |
| 50         |               |               | 50                | 156.89             | 16.00     | 8.0                                   |                  | 9.0                               |                  |                                   |                  |
| 55         |               |               | 55                | 142.63             | 14.54     | 8.8                                   |                  | 9.9                               |                  |                                   |                  |
| 60         |               |               | 60                | 130.74             | 13.33     | 9.6                                   |                  | 10.8                              |                  |                                   |                  |
| 65         |               |               | 65                | 120.68             | 12.31     | 10.4                                  |                  | 11.7                              |                  |                                   |                  |
| 70         |               |               | 70                | 112.06             | 11.43     | 11.2                                  |                  | 12.6                              |                  |                                   |                  |
| 75         |               |               | 75                | 104.59             | 10.67     | 12.0                                  |                  | 13.5                              |                  |                                   |                  |
| 80         |               |               | 80                | 98.06              | 10.00     | 12.8                                  |                  | 14.4                              |                  |                                   |                  |
| 90         |               |               | 90                | 87.16              | 8.89      | 14.4                                  |                  | 16.2                              |                  |                                   |                  |
| 100        |               |               | 100               | 78.44              | 8.00      | 16.0                                  |                  | 18.0                              |                  |                                   |                  |
| 125        |               |               | 125               | 62.76              | 6.40      | 20.0                                  |                  | 22.5                              |                  |                                   |                  |
| 150        | 150           | 52.30         | 5.33              | 24.0               | 27.0      |                                       |                  |                                   |                  |                                   |                  |
| TB 22 × 25 | 22            | 11            | 25                | 383.56             | 39.11     | 4.0                                   | 1,530<br>{156.0} | 4.5                               | 1,726<br>{176.0} | 5.0                               | 1,912<br>{195.0} |
| 30         |               |               | 30                | 319.63             | 32.59     | 4.8                                   |                  | 5.4                               |                  |                                   |                  |
| 35         |               |               | 35                | 273.97             | 27.94     | 5.6                                   |                  | 6.3                               |                  |                                   |                  |
| 40         |               |               | 40                | 239.72             | 24.44     | 6.4                                   |                  | 7.2                               |                  |                                   |                  |
| 45         |               |               | 45                | 213.09             | 21.73     | 7.2                                   |                  | 8.1                               |                  |                                   |                  |
| 50         |               |               | 50                | 191.78             | 19.56     | 8.0                                   |                  | 9.0                               |                  |                                   |                  |
| 55         |               |               | 55                | 174.34             | 17.78     | 8.8                                   |                  | 9.9                               |                  |                                   |                  |
| 60         |               |               | 60                | 159.81             | 16.30     | 9.6                                   |                  | 10.8                              |                  |                                   |                  |
| 65         |               |               | 65                | 147.52             | 15.04     | 10.4                                  |                  | 11.7                              |                  |                                   |                  |
| 70         |               |               | 70                | 136.98             | 13.97     | 11.2                                  |                  | 12.6                              |                  |                                   |                  |
| 75         |               |               | 75                | 127.85             | 13.04     | 12.0                                  |                  | 13.5                              |                  |                                   |                  |
| 80         |               |               | 80                | 119.86             | 12.22     | 12.8                                  |                  | 14.4                              |                  |                                   |                  |
| 90         |               |               | 90                | 106.54             | 10.86     | 14.4                                  |                  | 16.2                              |                  |                                   |                  |
| 100        |               |               | 100               | 95.89              | 9.78      | 16.0                                  |                  | 18.0                              |                  |                                   |                  |
| 125        |               |               | 125               | 76.71              | 7.82      | 20.0                                  |                  | 22.5                              |                  |                                   |                  |
| 150        | 150           | 63.93         | 6.52              | 24.0               | 27.0      |                                       |                  |                                   |                  |                                   |                  |
| TB 25 × 25 | 25            | 12.5          | 25                | 482.22             | 49.17     | 4.0                                   | 1,922<br>{196.0} | 4.5                               | 2,170<br>{221.3} | 5.0                               | 2,400<br>{244.7} |
| 30         |               |               | 30                | 401.85             | 40.98     | 4.8                                   |                  | 5.4                               |                  |                                   |                  |
| 35         |               |               | 35                | 344.44             | 35.12     | 5.6                                   |                  | 6.3                               |                  |                                   |                  |
| 40         |               |               | 40                | 301.39             | 30.73     | 6.4                                   |                  | 7.2                               |                  |                                   |                  |
| 45         |               |               | 45                | 267.90             | 27.32     | 7.2                                   |                  | 8.1                               |                  |                                   |                  |
| 50         |               |               | 50                | 241.11             | 24.59     | 8.0                                   |                  | 9.0                               |                  |                                   |                  |
| 55         |               |               | 55                | 219.19             | 22.35     | 8.8                                   |                  | 9.9                               |                  |                                   |                  |
| 60         |               |               | 60                | 200.93             | 20.49     | 9.6                                   |                  | 10.8                              |                  |                                   |                  |
| 65         |               |               | 65                | 185.47             | 18.91     | 10.4                                  |                  | 11.7                              |                  |                                   |                  |
| 70         |               |               | 70                | 172.22             | 17.56     | 11.2                                  |                  | 12.6                              |                  |                                   |                  |
| 75         |               |               | 75                | 160.74             | 16.39     | 12.0                                  |                  | 13.5                              |                  |                                   |                  |
| 80         |               |               | 80                | 150.69             | 15.37     | 12.8                                  |                  | 14.4                              |                  |                                   |                  |
| 90         |               |               | 90                | 133.95             | 13.66     | 14.4                                  |                  | 16.2                              |                  |                                   |                  |
| 100        |               |               | 100               | 120.56             | 12.29     | 16.0                                  |                  | 18.0                              |                  |                                   |                  |
| 125        |               |               | 125               | 96.44              | 9.83      | 20.0                                  |                  | 22.5                              |                  |                                   |                  |
| 150        | 150           | 80.37         | 8.20              | 24.0               | 27.0      |                                       |                  |                                   |                  |                                   |                  |
| 175        | 175           | 68.89         | 7.02              | 28.0               | 31.5      |                                       |                  |                                   |                  |                                   |                  |
| 200        | 200           | 60.28         | 6.15              | 32.0               | 36.0      |                                       |                  |                                   |                  |                                   |                  |



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|------------|---------------|---------------|-------------------|--------------------|-----------|--|------------------|--------------------------------------|------------------|--------------------------------------|------------------|
|            |               |               |                   | (N / mm)           | (Kgf /mm) | Deflexão                                 | Carga            | Deflexão                             | Carga            | Deflexão                             | Carga            |
| TB 27 × 25 | 27            | 13.5          | 25                | 568.89             | 58.01     | 4.0                                      | 2,280<br>{232.5} | 4.5                                  | 2,560<br>{261.1} | 5.0                                  | 2,840<br>{289.6} |
| 30         |               |               | 30                | 474.07             | 48.34     | 4.8                                      |                  | 5.4                                  |                  | 6.0                                  |                  |
| 35         |               |               | 35                | 406.35             | 41.44     | 5.6                                      |                  | 6.3                                  |                  | 7.0                                  |                  |
| 40         |               |               | 40                | 355.56             | 36.26     | 6.4                                      |                  | 7.2                                  |                  | 8.0                                  |                  |
| 45         |               |               | 45                | 316.05             | 32.23     | 7.2                                      |                  | 8.1                                  |                  | 9.0                                  |                  |
| 50         |               |               | 50                | 284.44             | 29.01     | 8.0                                      |                  | 9.0                                  |                  | 10.0                                 |                  |
| 55         |               |               | 55                | 258.59             | 26.37     | 8.8                                      |                  | 9.9                                  |                  | 11.0                                 |                  |
| 60         |               |               | 60                | 237.04             | 24.17     | 9.6                                      |                  | 10.8                                 |                  | 12.0                                 |                  |
| 65         |               |               | 65                | 218.80             | 22.31     | 10.4                                     |                  | 11.7                                 |                  | 13.0                                 |                  |
| 70         |               |               | 70                | 203.17             | 20.72     | 11.2                                     |                  | 12.6                                 |                  | 14.0                                 |                  |
| 75         |               |               | 75                | 189.63             | 19.34     | 12.0                                     |                  | 13.5                                 |                  | 15.0                                 |                  |
| 80         |               |               | 80                | 177.78             | 18.13     | 12.8                                     |                  | 14.4                                 |                  | 16.0                                 |                  |
| 90         |               |               | 90                | 158.02             | 16.11     | 14.4                                     |                  | 16.2                                 |                  | 18.0                                 |                  |
| 100        |               |               | 100               | 142.22             | 14.50     | 16.0                                     |                  | 18.0                                 |                  | 20.0                                 |                  |
| 125        |               |               | 125               | 113.78             | 11.60     | 20.0                                     |                  | 22.5                                 |                  | 25.0                                 |                  |
| 150        |               |               | 150               | 94.81              | 9.67      | 24.0                                     |                  | 27.0                                 |                  | 30.0                                 |                  |
| 175        |               |               | 175               | 81.27              | 8.29      | 28.0                                     |                  | 31.5                                 |                  | 35.0                                 |                  |
| 200        | 200           | 71.11         | 7.25              | 32.0               | 36.0      | 40.0                                     |                  |                                      |                  |                                      |                  |
| TB 30 × 25 | 30            | 15            | 25                | 706.67             | 72.06     | 4.0                                      | 2,820<br>{287.6} | 4.5                                  | 3,180<br>{324.3} | 5.0                                  | 3,530<br>{360.0} |
| 30         |               |               | 30                | 588.89             | 60.05     | 4.8                                      |                  | 5.4                                  |                  | 6.0                                  |                  |
| 35         |               |               | 35                | 504.76             | 51.47     | 5.6                                      |                  | 6.3                                  |                  | 7.0                                  |                  |
| 40         |               |               | 40                | 441.67             | 45.04     | 6.4                                      |                  | 7.2                                  |                  | 8.0                                  |                  |
| 45         |               |               | 45                | 392.59             | 40.03     | 7.2                                      |                  | 8.1                                  |                  | 9.0                                  |                  |
| 50         |               |               | 50                | 353.33             | 36.03     | 8.0                                      |                  | 9.0                                  |                  | 10.0                                 |                  |
| 55         |               |               | 55                | 321.21             | 32.75     | 8.8                                      |                  | 9.9                                  |                  | 11.0                                 |                  |
| 60         |               |               | 60                | 294.44             | 30.02     | 9.6                                      |                  | 10.8                                 |                  | 12.0                                 |                  |
| 65         |               |               | 65                | 271.79             | 27.72     | 10.4                                     |                  | 11.7                                 |                  | 13.0                                 |                  |
| 70         |               |               | 70                | 252.38             | 25.74     | 11.2                                     |                  | 12.6                                 |                  | 14.0                                 |                  |
| 75         |               |               | 75                | 235.56             | 24.02     | 12.0                                     |                  | 13.5                                 |                  | 15.0                                 |                  |
| 80         |               |               | 80                | 220.83             | 22.52     | 12.8                                     |                  | 14.4                                 |                  | 16.0                                 |                  |
| 90         |               |               | 90                | 196.30             | 20.02     | 14.4                                     |                  | 16.2                                 |                  | 18.0                                 |                  |
| 100        |               |               | 100               | 176.67             | 18.01     | 16.0                                     |                  | 18.0                                 |                  | 20.0                                 |                  |
| 125        |               |               | 125               | 141.33             | 14.41     | 20.0                                     |                  | 22.5                                 |                  | 25.0                                 |                  |
| 150        |               |               | 150               | 117.78             | 12.01     | 24.0                                     |                  | 27.0                                 |                  | 30.0                                 |                  |
| 175        |               |               | 175               | 100.95             | 10.29     | 28.0                                     |                  | 31.5                                 |                  | 35.0                                 |                  |
| 200        | 200           | 88.33         | 9.01              | 32.0               | 36.0      | 40.0                                     |                  |                                      |                  |                                      |                  |
| TB 35 × 40 | 35            | 17.5          | 40                | 600.00             | 61.18     | 6.4                                      | 3,840<br>{391.6} | 7.2                                  | 4,320<br>{440.5} | 8.0                                  | 4,810<br>{490.5} |
| 45         |               |               | 45                | 533.33             | 54.38     | 7.2                                      |                  | 8.1                                  |                  | 9.0                                  |                  |
| 50         |               |               | 50                | 480.00             | 48.95     | 8.0                                      |                  | 9.0                                  |                  | 10.0                                 |                  |
| 55         |               |               | 55                | 436.36             | 44.50     | 8.8                                      |                  | 9.9                                  |                  | 11.0                                 |                  |
| 60         |               |               | 60                | 400.00             | 40.79     | 9.6                                      |                  | 10.8                                 |                  | 12.0                                 |                  |
| 65         |               |               | 65                | 369.23             | 37.65     | 10.4                                     |                  | 11.7                                 |                  | 13.0                                 |                  |
| 70         |               |               | 70                | 342.86             | 34.96     | 11.2                                     |                  | 12.6                                 |                  | 14.0                                 |                  |
| 75         |               |               | 75                | 320.00             | 32.63     | 12.0                                     |                  | 13.5                                 |                  | 15.0                                 |                  |
| 80         |               |               | 80                | 300.00             | 30.59     | 12.8                                     |                  | 14.4                                 |                  | 16.0                                 |                  |
| 90         |               |               | 90                | 266.67             | 27.19     | 14.4                                     |                  | 16.2                                 |                  | 18.0                                 |                  |
| 100        |               |               | 100               | 240.00             | 24.47     | 16.0                                     |                  | 18.0                                 |                  | 20.0                                 |                  |
| 125        |               |               | 125               | 192.00             | 19.58     | 20.0                                     |                  | 22.5                                 |                  | 25.0                                 |                  |
| 150        |               |               | 150               | 160.00             | 16.32     | 24.0                                     |                  | 27.0                                 |                  | 30.0                                 |                  |
| 175        |               |               | 175               | 137.14             | 13.98     | 28.0                                     |                  | 31.5                                 |                  | 35.0                                 |                  |
| 200        | 200           | 120.00        | 12.24             | 32.0               | 36.0      | 40.0                                     |                  |                                      |                  |                                      |                  |





## Carga Extra Pesada

| Referência | Diam. Externo | Diam. Interno | Compr. Total (mm) | Constante Elástica |           | 16% do compr. total 1Milhão de ciclos |                  | 18% do compr. total 500mil ciclos |                  | 20% do compr. total 300mil ciclos |                  |
|------------|---------------|---------------|-------------------|--------------------|-----------|---------------------------------------|------------------|-----------------------------------|------------------|-----------------------------------|------------------|
|            |               |               |                   | (N / mm)           | (Kgf /mm) | Deflexão                              | Carga            | Deflexão                          | Carga            | Deflexão                          | Carga            |
| TB 40 × 40 | 40            | 20            | 40                | 784.72             | 80.02     | 6.4                                   | 5,020<br>{511.9} | 7.2                               | 5,650<br>{576.1} | 8.0                               | 6,280<br>{640.4} |
| 45         |               |               | 45                | 697.53             | 71.13     | 7.2                                   |                  | 8.1                               |                  |                                   |                  |
| 50         |               |               | 50                | 627.78             | 64.02     | 8.0                                   |                  | 9.0                               |                  |                                   |                  |
| 55         |               |               | 55                | 570.71             | 58.20     | 8.8                                   |                  | 9.9                               |                  |                                   |                  |
| 60         |               |               | 60                | 523.15             | 53.35     | 9.6                                   |                  | 10.8                              |                  |                                   |                  |
| 65         |               |               | 65                | 482.91             | 49.24     | 10.4                                  |                  | 11.7                              |                  |                                   |                  |
| 70         |               |               | 70                | 448.41             | 45.73     | 11.2                                  |                  | 12.6                              |                  |                                   |                  |
| 75         |               |               | 75                | 418.52             | 42.68     | 12.0                                  |                  | 13.5                              |                  |                                   |                  |
| 80         |               |               | 80                | 392.36             | 40.01     | 12.8                                  |                  | 14.4                              |                  |                                   |                  |
| 90         |               |               | 90                | 348.77             | 35.56     | 14.4                                  |                  | 16.2                              |                  |                                   |                  |
| 100        |               |               | 100               | 313.89             | 32.01     | 16.0                                  |                  | 18.0                              |                  |                                   |                  |
| 125        |               |               | 125               | 251.11             | 25.61     | 20.0                                  |                  | 22.5                              |                  |                                   |                  |
| 150        |               |               | 150               | 209.26             | 21.34     | 24.0                                  |                  | 27.0                              |                  |                                   |                  |
| 175        |               |               | 175               | 179.37             | 18.29     | 28.0                                  |                  | 31.5                              |                  |                                   |                  |
| 200        |               |               | 200               | 156.94             | 16.00     | 32.0                                  |                  | 36.0                              |                  |                                   |                  |
| 225        |               |               | 225               | 139.51             | 14.23     | 36.0                                  |                  | 40.5                              |                  |                                   |                  |
| 250        |               |               | 250               | 125.56             | 12.80     | 40.0                                  |                  | 45.0                              |                  |                                   |                  |
| 275        | 275           | 114.14        | 11.64             | 44.0               | 49.5      |                                       |                  |                                   |                  |                                   |                  |
| 300        | 300           | 104.63        | 10.67             | 48.0               | 54.0      |                                       |                  |                                   |                  |                                   |                  |
| TB 50 × 50 | 50            | 25            | 50                | 981.11             | 100.0     | 8.0                                   | 7,850<br>{800.5} | 9.0                               | 8,830<br>{900.4} | 10.0                              | 9,810<br>{1000}  |
| 55         |               |               | 55                | 891.92             | 90.95     | 8.8                                   |                  | 9.9                               |                  |                                   |                  |
| 60         |               |               | 60                | 817.59             | 83.37     | 9.6                                   |                  | 10.8                              |                  |                                   |                  |
| 65         |               |               | 65                | 754.70             | 76.96     | 10.4                                  |                  | 11.7                              |                  |                                   |                  |
| 70         |               |               | 70                | 700.79             | 71.46     | 11.2                                  |                  | 12.6                              |                  |                                   |                  |
| 75         |               |               | 75                | 654.07             | 66.70     | 12.0                                  |                  | 13.5                              |                  |                                   |                  |
| 80         |               |               | 80                | 613.19             | 62.53     | 12.8                                  |                  | 14.4                              |                  |                                   |                  |
| 90         |               |               | 90                | 545.06             | 55.58     | 14.4                                  |                  | 16.2                              |                  |                                   |                  |
| 100        |               |               | 100               | 490.56             | 50.02     | 16.0                                  |                  | 18.0                              |                  |                                   |                  |
| 125        |               |               | 125               | 392.44             | 40.02     | 20.0                                  |                  | 22.5                              |                  |                                   |                  |
| 150        |               |               | 150               | 327.04             | 33.35     | 24.0                                  |                  | 27.0                              |                  |                                   |                  |
| 175        |               |               | 175               | 280.32             | 28.58     | 28.0                                  |                  | 31.5                              |                  |                                   |                  |
| 200        |               |               | 200               | 245.28             | 25.01     | 32.0                                  |                  | 36.0                              |                  |                                   |                  |
| 225        |               |               | 225               | 218.02             | 22.23     | 36.0                                  |                  | 40.5                              |                  |                                   |                  |
| 250        |               |               | 250               | 196.22             | 20.01     | 40.0                                  |                  | 45.0                              |                  |                                   |                  |
| 275        |               |               | 275               | 178.38             | 18.19     | 44.0                                  |                  | 49.5                              |                  |                                   |                  |
| 300        |               |               | 300               | 163.52             | 16.67     | 48.0                                  |                  | 54.0                              |                  |                                   |                  |
| 350        | 350           | 140.16        | 14.29             | 56.0               | 63.0      |                                       |                  |                                   |                  |                                   |                  |
| TB 60 × 60 | 60            | 30            | 60                | 1176.85            | 120.0     | 9.6                                   | 11,300<br>{1152} | 10.8                              | 12,710<br>{1296} | 12.0                              | 14,120<br>{1440} |
| 70         |               |               | 70                | 1008.73            | 102.9     | 11.2                                  |                  | 12.6                              |                  |                                   |                  |
| 80         |               |               | 80                | 882.64             | 90.00     | 12.8                                  |                  | 14.4                              |                  |                                   |                  |
| 90         |               |               | 90                | 784.57             | 80.00     | 14.4                                  |                  | 16.2                              |                  |                                   |                  |
| 100        |               |               | 100               | 706.11             | 72.00     | 16.0                                  |                  | 18.0                              |                  |                                   |                  |
| 125        |               |               | 125               | 564.89             | 57.60     | 20.0                                  |                  | 22.5                              |                  |                                   |                  |
| 150        |               |               | 150               | 470.74             | 48.00     | 24.0                                  |                  | 27.0                              |                  |                                   |                  |
| 175        |               |               | 175               | 403.49             | 41.14     | 28.0                                  |                  | 31.5                              |                  |                                   |                  |
| 200        |               |               | 200               | 353.06             | 36.00     | 32.0                                  |                  | 36.0                              |                  |                                   |                  |
| 225        |               |               | 225               | 313.83             | 32.00     | 36.0                                  |                  | 40.5                              |                  |                                   |                  |
| 250        |               |               | 250               | 282.44             | 28.80     | 40.0                                  |                  | 45.0                              |                  |                                   |                  |
| 275        |               |               | 275               | 256.77             | 26.18     | 44.0                                  |                  | 49.5                              |                  |                                   |                  |
| 300        |               |               | 300               | 235.37             | 24.00     | 48.0                                  |                  | 54.0                              |                  |                                   |                  |
| 350        | 350           | 201.75        | 20.57             | 56.0               | 63.0      |                                       |                  |                                   |                  |                                   |                  |





## Carga Extra Pesada

| Referência | Diam. Externo | Diam. Interno | Compr. Total (mm) | Constante Elástica |           | 16% do compr. total<br>1Milhão de ciclos |                  | 18% do compr. total<br>500mil ciclos |                  | 20% do compr. total<br>300mil ciclos |                  |
|------------|---------------|---------------|-------------------|--------------------|-----------|--|------------------|--------------------------------------|------------------|--------------------------------------|------------------|
|            |               |               |                   | (N / mm)           | (Kgf /mm) | Deflexão                                 | Carga            | Deflexão                             | Carga            | Deflexão                             | Carga            |
| TB 70 x 70 | 70            | 38.5          | 70                | 1285.71            | { 131.1 } | 11.2                                     | 14,400<br>{1468} | 12.6                                 | 16,200<br>{1652} | 14.0                                 | 18,000<br>{1836} |
| 80         |               |               | 80                | 1125.00            | { 114.7 } | 12.8                                     |                  | 14.4                                 |                  | 16.0                                 |                  |
| 90         |               |               | 90                | 1000.00            | { 102.0 } | 14.4                                     |                  | 16.2                                 |                  | 18.0                                 |                  |
| 100        |               |               | 100               | 900.00             | { 91.77 } | 16.0                                     |                  | 18.0                                 |                  | 20.0                                 |                  |
| 125        |               |               | 125               | 720.00             | { 73.42 } | 20.0                                     |                  | 22.5                                 |                  | 25.0                                 |                  |
| 150        |               |               | 150               | 600.00             | { 61.18 } | 24.0                                     |                  | 27.0                                 |                  | 30.0                                 |                  |
| 175        |               |               | 175               | 514.29             | { 52.44 } | 28.0                                     |                  | 31.5                                 |                  | 35.0                                 |                  |
| 200        |               |               | 200               | 450.00             | { 45.89 } | 32.0                                     |                  | 36.0                                 |                  | 40.0                                 |                  |
| 225        |               |               | 225               | 400.00             | { 40.79 } | 36.0                                     |                  | 40.5                                 |                  | 45.0                                 |                  |
| 250        |               |               | 250               | 360.00             | { 36.71 } | 40.0                                     |                  | 45.0                                 |                  | 50.0                                 |                  |
| 275        |               |               | 275               | 327.27             | { 33.37 } | 44.0                                     |                  | 49.5                                 |                  | 55.0                                 |                  |
| 300        |               |               | 300               | 300.00             | { 30.59 } | 48.0                                     |                  | 54.0                                 |                  | 60.0                                 |                  |
| 350        |               |               | 350               | 257.14             | { 26.22 } | 56.0                                     |                  | 63.0                                 |                  | 70.0                                 |                  |

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