

Jacking pipes with CC-GRP sleeve PN1: Minimum wall thickness and Allowable jacking force  
acc. Equations 15 and 18 with factor of 3.5

| DE<br>pipe | 32 000 N/m² |               | 40.000 N/m² |               | 50.000 N/m² |               | 64.000 N/m² |               | 80.000 N/m² |               | 100.000 N/m² |               | 128.000 N/m² |               | 160 000 N/m² |               | 200.000 N/m² |               | 320.000 N/m² |               | 640.000 N/m² |               | 1.000.000 N/m² |               |
|------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|----------------|---------------|
|            | s5<br>[mm]  | Fmax.<br>[kN] | s5<br>[mm]  | Fmax.<br>[kN] | s5<br>[mm]  | Fmax.<br>[kN] | s5<br>[mm]  | Fmax.<br>[kN] | s5<br>[mm]  | Fmax.<br>[kN] | s5<br>[mm]   | Fmax.<br>[kN] | s5<br>[mm]   | Fmax.<br>[kN] | s5<br>[mm]   | Fmax.<br>[kN] | s5<br>[mm]   | Fmax.<br>[kN] | s5<br>[mm]   | Fmax.<br>[kN] | s5<br>[mm]   | Fmax.<br>[kN] | s5<br>[mm]     | Fmax.<br>[kN] |
| 427        |             |               |             |               |             |               |             |               |             |               |              |               |              |               |              |               |              |               |              |               | 34           | 698           | 39             | 840           |
| 478        |             |               |             |               |             |               |             |               |             |               |              |               |              |               |              |               |              |               |              |               | 41           | 1 018         | 46             | 1 175         |
| 530        |             |               |             |               |             |               |             |               |             |               |              |               |              |               |              |               |              |               | 36           | 952           | 44           | 1 241         | 51             | 1 486         |
| 550        |             |               |             |               |             |               |             |               |             |               |              |               |              |               |              |               | 33           | 861           | 38           | 1 053         | 47           | 1 390         | 53             | 1 607         |
| 616        |             |               |             |               |             |               |             |               |             |               |              |               |              |               | 34           | 1 021         | 37           | 1 153         | 43           | 1 412         | 50           | 1 707         | 58             | 2 035         |
| 650        |             |               |             |               |             |               |             |               |             |               |              |               | 33           | 1 032         | 35           | 1 126         | 38           | 1 265         | 44           | 1 539         | 54           | 1 983         | 62             | 2 327         |
| 718        |             |               |             |               |             |               |             |               |             |               | 32           | 1 098         | 35           | 1 256         | 40           | 1 515         | 43           | 1 669         | 48           | 1 922         | 59           | 2 464         | 68             | 2 892         |
| 752        |             |               |             |               |             |               |             |               | 33          | 1 207         | 36           | 1 372         | 39           | 1 536         | 42           | 1 698         | 45           | 1 859         | 51           | 2 176         | 62           | 2 741         | 72             | 3 239         |
| 820        |             |               |             |               |             |               | 33          | 1 216         | 35          | 1 337         | 38           | 1 518         | 42           | 1 757         | 45           | 1 934         | 49           | 2 168         | 54           | 2 457         | 67           | 3 190         | 78             | 3 788         |
| 860        |             |               |             |               |             |               | 35          | 1 407         | 37          | 1 534         | 40           | 1 724         | 43           | 1 912         | 47           | 2 160         | 51           | 2 406         | 58           | 2 830         | 72           | 3 654         | 80             | 4 111         |
| 924        |             |               |             |               | 34          | 1 442         | 37          | 1 648         | 40          | 1 853         | 42           | 1 989         | 46           | 2 258         | 50           | 2 525         | 54           | 2 790         | 62           | 3 311         | 77           | 4 260         |                |               |
| 960        | 31          | 1 254         | 34          | 1 470         | 36          | 1 614         | 39          | 1 828         | 42          | 2 041         | 44           | 2 181         | 48           | 2 461         | 52           | 2 739         | 56           | 3 013         | 64           | 3 555         | 80           | 4 607         |                |               |
| 1026       | 34          | 1 561         | 36          | 1 715         | 38          | 1 869         | 41          | 2 098         | 44          | 2 325         | 48           | 2 626         | 52           | 2 925         | 56           | 3 221         | 61           | 3 587         | 68           | 4 094         |              |               |                |               |
| 1099       | 35          | 1 700         | 38          | 1 948         | 41          | 2 194         | 44          | 2 439         | 48          | 2 764         | 51           | 3 006         | 56           | 3 406         | 59           | 3 643         | 64           | 4 037         | 73           | 4 734         |              |               |                |               |
| 1229       | 40          | 2 261         | 43          | 2 539         | 46          | 2 814         | 49          | 3 089         | 53          | 3 453         | 56           | 3 724         | 61           | 4 172         | 66           | 4 616         | 71           | 5 057         | 81           | 5 925         |              |               |                |               |
| 1280       | 41          | 2 405         | 45          | 2 791         | 47          | 2 982         | 52          | 3 458         | 55          | 3 742         | 59           | 4 118         | 64           | 4 585         | 68           | 4 955         |              |               |              |               |              |               |                |               |
| 1348       | 44          | 2 803         | 47          | 3 107         | 50          | 3 410         | 54          | 3 811         | 58          | 4 210         | 62           | 4 606         | 67           | 5 097         | 72           | 5 585         |              |               |              |               |              |               |                |               |
| 1434       | 46          | 3 106         | 49          | 3 430         | 52          | 3 753         | 57          | 4 287         | 61          | 4 712         | 65           | 5 134         | 71           | 5 763         | 76           | 6 282         |              |               |              |               |              |               |                |               |
| 1499       | 48          | 3 464         | 52          | 3 915         | 56          | 4 363         | 60          | 4 809         | 64          | 5 252         | 68           | 5 692         | 74           | 6 348         | 79           | 6 891         |              |               |              |               |              |               |                |               |
| 1535       | 48          | 3 526         | 52          | 3 989         | 56          | 4 451         | 60          | 4 910         | 64          | 5 366         | 69           | 5 932         | 75           | 6 607         |              |               |              |               |              |               |              |               |                |               |
| 1638       | 52          | 4 158         | 56          | 4 652         | 60          | 5 143         | 65          | 5 753         | 70          | 6 359         | 75           | 6 962         | 81           | 7 679         |              |               |              |               |              |               |              |               |                |               |
| 1720       | 55          | 4 398         | 59          | 4 916         | 64          | 5 559         | 68          | 6 071         | 73          | 6 708         | 78           | 7 340         |              |               |              |               |              |               |              |               |              |               |                |               |
| 1780       | 56          | 4 653         | 60          | 5 189         | 64          | 5 723         | 69          | 6 387         | 74          | 7 047         | 80           | 7 834         |              |               |              |               |              |               |              |               |              |               |                |               |
| 1842       | 59          | 5 212         | 63          | 5 767         | 68          | 6 457         | 73          | 7 143         | 78          | 7 825         | 83           | 8 503         |              |               |              |               |              |               |              |               |              |               |                |               |
| 1937       | 62          | 5 830         | 67          | 6 560         | 72          | 7 286         | 77          | 8 007         | 81          | 8 582         |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2047       | 65          | 6 407         | 70          | 7 178         | 75          | 7 945         | 81          | 8 859         | 85          | 9 466         |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2160       | 69          | 7 324         | 74          | 8 137         | 79          | 8 945         | 85          | 9 910         | 90          | 10 709        |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2250       | 71          | 7 849         | 76          | 8 697         | 82          | 9 709         | 87          | 10 548        | 94          | 11 716        |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2400       | 76          | 9 050         | 81          | 9 953         | 86          | 10 853        | 93          | 12 105        | 100         | 13 350        |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2453       | 80          | 9 955         | 82          | 10 325        | 88          | 11 430        | 95          | 12 712        | 102         | 13 986        |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2555       | 82          | 10 690        | 85          | 11 267        | 92          | 12 610        | 99          | 13 945        | 106         | 15 271        |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 2999       | 94          | 13 696        | 100         | 15 055        | 108         | 16 858        | 117         | 18 874        | 127         | 21 098        |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 3270       | 101         | 16 680        | 108         | 18 410        | 116         | 20 378        | 126         | 22 824        |             |               |              |               |              |               |              |               |              |               |              |               |              |               |                |               |
| 3600       | 111         | 20 989        | 119         | 23 166        | 128         | 25 601        | 138         | 28 292        |             |               |              |               |              |               |              |               |              |               |              |               |              |               |                |               |