

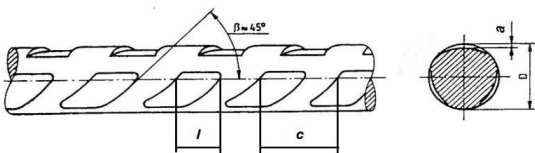
Belgium homologations  
Prestressing strands

| BENOR number | Diameter | Tolerance of diameter | Nominal tensile strength | number of wires | Nominal cross section | Nominal unit weight | Tolerance of section and weight | Breaking force (F <sub>m</sub> ) | Proof force (F <sub>p0,1</sub> ) | Proof force (F <sub>p0,2</sub> ) | Elasticity modulus | Ratio F <sub>m</sub> /F <sub>p0,2</sub> | Total elongation at max. force (A <sub>gt</sub> ) | Lay length |      | Straight-ness in 1 m length | Construction of wires | Deflected tensile test | Stress corrosion resistance                        | Fatigue resistance at 0,8 F <sub>pu</sub>       | Relaxation at 0,7 F <sub>pu</sub> |
|--------------|----------|-----------------------|--------------------------|-----------------|-----------------------|---------------------|---------------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------|---|---|------------|------|-----------------------------|-----------------------|------------------------|--|---|-----------------------------------|
|              | [mm]     | [mm]                  | [Nmm <sup>2</sup> ]      |                 | [mm <sup>2</sup> ]    | [g/m]               | [%]                             | [kN]                             | [kN]                             | [kN]                             | [Gpa]              |   | [%]   | [mm]       | [mm] |                             |                       | [%]                    | [hours]  | [cycles]  | [%]                               |
| 315          | 7,5      | +0,3                  | 1860                     | 3               | 29                    | 227,7               | ± 2                             | 54                               | 45,9                             | 47                               | 200 ± 10           | 1,025                                   | 3,5   | 135        | 180  | max. 25 mm                  | 3x3,50 mm             | -                      | d <sub>sw</sub> <3,2 mm<br>individ. 1,5<br>mean: 3 | with 200<br>Mpa range<br>min. 2x10 <sup>6</sup> | max. 2,5                          |
|              | 6,9      |                       |                          | 7               | 29                    | 227,7               |                                 | 54                               | 46                               | 48                               |                    |   |   | 97         | 124  |                             | 2,36+6x2,28 mm        |                        |  |   |                                   |
|              | 9,3      |                       |                          | 7               | 52                    | 408                 |                                 | 97                               | 82                               | 85                               |                    |   |   | 130        | 167  |                             | 3,16+6x3,05 mm        |                        |  |   |                                   |
|              | 12,5     | +0,4<br>-0,2          |                          | 7               | 93                    | 730                 |                                 | 173                              | 147                              | 152                              |                    |   |   | 175        | 225  |                             | 4,25+6x4,08 mm        |                        |  |   |                                   |
|              | 12,9     |                       |                          | 7               | 100                   | 785                 |                                 | 186                              | 158                              | 163                              |                    |   |   | 181        | 232  |                             | 4,40+6x4,25 mm        |                        |  |   |                                   |
|              | 15,2     |                       |                          | 7               | 139                   | 1090                |                                 | 260                              | 220                              | 228                              |                    |   |   | 213        | 274  |                             | 5,25+6x5,00 mm        |                        |  |   |                                   |
|              | 15,7     |                       |                          | 7               | 150                   | 1180                |                                 | 279                              | 237                              | 246                              |                    |   |   | 220        | 283  |                             | 5,40+6x5,17 mm        |                        |  |   |                                   |

Prestressing indented wires

| certificate number | Diameter | Nominal tensile strength | Nominal cross section | Nominal unit weight | Breaking force (F <sub>m</sub> ) | Elasticity modulus | Proof force (F <sub>p0,1</sub> ) | Proof force (F <sub>p0,2</sub> ) | Total elongation at maximum force (ε <sub>pu</sub> ) | Indentation |           |           | Number of reverse bends | Straightness in 1 m length | Stress corrosion resistance     | fatigue resistance at 0,8 F <sub>m</sub>     | Relaxation at 0,7 F <sub>m</sub> |
|--------------------|----------|--------------------------|-----------------------|---------------------|----------------------------------|--------------------|----------------------------------|----------------------------------|--|-------------|-----------|-----------|-------------------------|----------------------------|---------------------------------|--|----------------------------------|
|                    |          |                          |                       |                     | min.                             |                    |                                  |                                  |  | depth (a)   | Width (l) | Spacing © |                         |                            |                                 |  |                                  |
|                    |          |                          |                       |                     | [kN]                             |                    |                                  |                                  |  | [mm]        | [mm]      | [mm]      |                         |                            |                                 |  |                                  |
| 315                | 4        | 1770                     | 12,6±0,25             | 98,9±2,0            | 22,3                             | 205 ± 10           | 18,5                             | 19                               | min. 3,5   | 0,12±0,05   | 3,5±0,5   | 5,5±0,5   | 3 (R=10)                | max. 25                    | min. 2 hours,<br>median>5 hours | with 180 Mpa range<br>min. 2x10 <sup>6</sup> | max. 2,5                         |
|                    | 5        |                          | 19,6±0,39             | 153,9±3,1           | 34,7                             |                    | 28,8                             | 29,5                             |  |             |           |           |                         |                            |                                 |  |                                  |

Coil dimensions - strands



| Outer diameter D (mm) | Inner diameter d (mm) | Wide (mm) | Weight (kg) |
|-----------------------|-----------------------|-----------|-------------|
|                       |                       | W         |             |
|                       |                       | (mm)      | (kg)        |
| Max. 1600             | 800                   | 500       | Max. 4300   |
|                       | 900                   | 710       |             |
|                       | 965                   | 750       |             |

Coil dimensions - wires

|           |           |          |           |
|-----------|-----------|----------|-----------|
| max. 2400 | 1350-1800 | max. 300 | max. 2000 |
| max. 1430 | 965-1030  | 500-530  | max. 2000 |

