

## Durglass® anchors and bolts



**DURGLASS** glass fiber structural elements, bars and pipes are used to pre-confine and stabilize the tunnel front in order to temporarily control deformations induced by excavation. **DURGLASS** products can be afterwards destroyed without damaging the excavating equipment.

### DURGLASS® AND GLASSPREE® SPECIFICATIONS\*

Density	ASTM D792	1.95 g/cm <sup>3</sup>
Ultimate tensile strength	ASTM D7205	760 - 1000 MPa
Tensile modulus of elasticità	ASTM D7205	40-46 GPa
Shear strength	ASTM D7617	100 - 200 MPa
Fiber content	ASTM D2584	>65%

\* Based on ASTM International's testing method.

### DURGLASS® ROUND BARS

Diameter (mm)	Average Tensile strength ( $f_{u,ave}$ ) - MPa	Nominal tensile load kN
20	950	295
22	850	325
25	850	430
28	850	520
32	850	670
36	760	860
40	760	950



### DURGLASS® ROUND BARS

Internal/external diameter (mm)	Type	Nominal breaking load - kN
14/28	Blind	450
40/60	Blind/sleeved	900
60/76	Blind	1000



### DURGLASS® SINGLE BAR Structural Elements

Type	Bar mm	Nominal breaking load kN
EM 20	Flat 40x5	200
EM 24	Flat 40x6	240
EM 28	Flat 40x7	280
EM 32	Flat 40x8	320
EM 36	Flat 40x9	360
Y 35F	Y 35	350
Y 55F	Y 55	550



EM



Y35F and Y55F

### DURGLASS® DOUBLE BAR Structural Elements

Type	Bars Mm	Nominal breaking load kN
ED 40	2 Flat 40x5	400
ED 48	2 Flat 40x6	480
ED 56	2 Flat 40x7	560
ED 64	2 Flat 40x8	640
ED 72	2 Flat 40x9	720



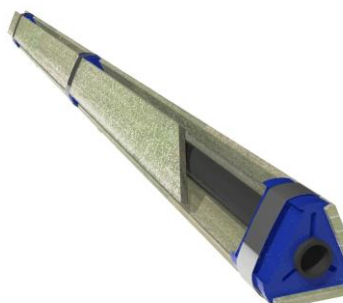
ED with grouting pipe



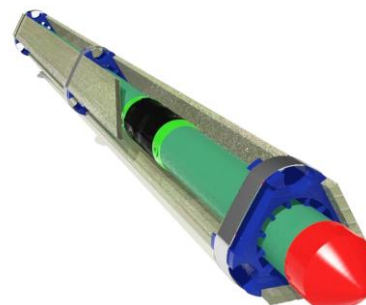
ED with Durvinil® sleeved pipe

### DURGLASS® TRIPLE BAR Structural Elements

Type	Bars Mm	Nominal breaking load kN
ES 60	3 Flat 40x5	600
ES 72	3 Flat 40x6	720
ES 84	3 Flat 40x7	840
ES 96	3 Flat 40x8	960
ES 100	3 Flat 40x9	1080



ES with grouting pipe



ES with Durvinil® sleeved pipe