

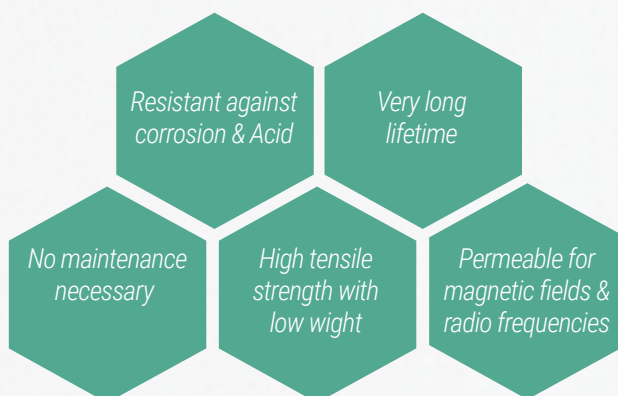


## GRP REINFORCEMENT

Components often have to be renovated or even completely replaced because the steel reinforcement is rusted through and the concrete structure has been destroyed. This is especially true for components exposed to de-icing salt. When using GRP reinforcement, corrosion is no longer an issue. A GRP reinforcement reduces the number of repairs to the components. GRP reinforcements are mainly used in concrete and polymer concrete parts

## COMPARISON OF STEEL AND GRP REINFORCEMENT

Characteristics	Steel Reinforcement	GRP-Reinforcement
Material	Steel	GRP
Tensile strength, MPa	360-390	1200-1300
Young's modulus, MPa	200000	60000
Elongation at break, %	25	2,2
Lin. Thermal expansion coefficient, 10 <sup>-6</sup> /K	13-15	9-12
Density, kg/dm <sup>3</sup>	7	1,9
Length	6-12m	6 m or as desired
Corrosion and chemical resistance	no	yes
Thermal conductivity	yes	no
Dielectric	no	yes
Radiolucent	no	yes
Insensitivity to electromagnetic fields	no	yes
Expected service life	30 years	100 yers
Diameter Ø		4, 6, 8, 10, 12, 14 mm



## Mechanical Properties

### GRP-Rods for Concrete Reinforcement

The properties can vary depending on the diameter.  
 The material properties are based on typical values and must be checked by the end user depending on the application.  
 The bars do not have a general construction approval.

Profile	Rod with spiral coil
Matrix	Epoxy resin
Reinforcement	ECR-Glass fiber
Diameters, mm	4, 6, 8, 10, 12, 14, ... max. 40
Standard length, mm	6000
Custom length	possible upon request
Color	nature/(greenish/brownish)

Tensile strength, MPa	1200
E-Modul, GPa	60
Elongation, %	2,2
Density, kg/dm <sup>3</sup>	2,1
Barcol hardness	>60
Coefficient of thermal expansion, 1/K	12*10E-6
Spec. insulation resist. Ohm/cm	10E10-10E15
Surface resistance, Ohm	10E10-10E13
Dielectric strength, kV/mm	5
Tracking index CTI	KC 600
Dielectric constant	<5
Dissipation factor	0,01
Thermal conductivity, W/m*K	0,4
Specific heat capacity, kJ/kg*K	1,0-0,6
Max. continuous temperature °C	-100 / +155
Heatclass	F
Water absorption %	<0,15
Temperature deflection under load (martens) °C	200
Incandescence resistance	2b
Fire resistance standard	DIN 4102 B2
Corrosion of smoke, pH	6,1
Burning energy, J/g	7639

Pull-out-test	
Concrete C16/20 - cube 100x100x100 mm	
Rod 6 mm - pull-out-force 16 kN	
Rod 8 mm - pull-out-force 35 kN	