Technical Data Sheet
STEKON fiber-reinforced polymer bar
Reinforcement of prefabricated and monolithic ferro-concrete structures and articles

STEKON fiber-reinforced polymer bar (composite rebar) refers to rods made of reinforcing fibers impregnated with a polymer thermosetting binding agent and cured, with transversal or helical ribs made on surface of the rods

Typical application:

- ✓ footing of residential buildings, industrial strictures and other structural concepts on elastic foundations
- ✓ industrial flooring and open platforms for machinery
- ✓ hydraulic works (purification and treatment facilities, water sluices and water-draining facilities, pumping stations)
- ✓ bridgeworks, berthing and marine facilities
- ✓ tunnels structures
- ✓ normal and pre-stressed civil structures when constructing monolithic concrete and prefabricated buildings
- ✓ structural parts as individual rods
- ✓ retaining walls and structures
- ✓ load-bearing/non-loadbearing wall elements
- ✓ concrete elements and structures on foundation (footings, floors, slabs and etc.)
- ✓ bridges
- ✓ railroad beds
- ✓ fencings
- ✓ electric power plants, buildings and facilities involving electromagnetic emission
- ✓ building and facilities for storing solid domestic wastes, highly-toxic wastes.

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Physical and mechanical properties

Material	Steel bars AIII (A400C)	STEKON fiber-reinforced polymer bar
Ultimate tensile strength, MPa	σtests based average - 390 σdeclared - 355	σtests based average – 1200 σdeclared - 1000
Elongation, %	up to 14	2.0
Heat conductivity factor, W/(m·°C)	46	0.35
Young's modulus of elasticity, MPa	200 000	50 000
Linear expansion factor	13-15	9-12
Density, g/cm^3	7.8	2
Resistance to corrosion	low	high
Electric conductivity	yes	no
Length of rods	6-12 m	not limited

Advantages:

Coiling is possible

+ With its inherent strength performance and its structure being essentially different from structure of steel, fiber-reinforced polymer bar, if 4 to 12 mm in diameter, can be coiled. As a result, alongside with thereby optimized logistics, storage and installation, butt-joints may almost be avoided while reinforcing framework composed of solid rods.
+ Bars of greater diameters are produced only as rods
+ Any length of rods or coiling is possible upon agreeing about with a customer

Cost efficiency

+ Assuming a possible calculated substitution of diameters, direct saving would achieve 10-30% owing to reduced cost of reinforcing framework
+ Subject to optimization of building machinery, process savings may be several times greater than direct savings

Low weight:

+ significant reduction (5-10 times) in spending for delivering bars to a destination site
+ reduction in man-hours for on-and-off loading activities, which require no machinery

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Comparison between weights of metal and fiber-reinforced polymer bars, if equal in strength

Diameter of a bar, mm	Metal bar of grade A- III (A400C) (kg/1 l.m.)	Diameter of a bar, mm	STEKON fiber-reinforced polymer bar (kg/1 l.m.)
8	**0,395**	6	**0,057**
10	**0,617**	7	**0,08**
12	**0,888**	8	**0,1**
14	**1,21**	10	**0,16**
16	**1,58**	12	**0,22**
18	**2**	14	**0,31**
20	**2,47**	16	**0,41**

High resistance to corrosion

+ Possible use under exposure to aggressive media
+ Possible thinning of protective concrete layer
+ Extended operational lifetime of a facility
+ Extended inter-maintenance period
+ Reduced expenses for operation of a facility

Easy installation:

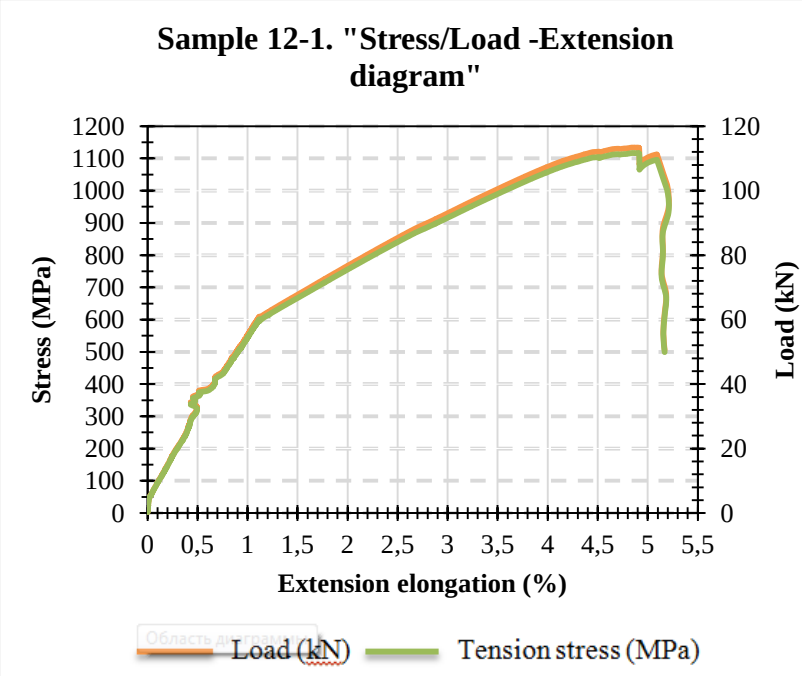
+ Use of building machinery may be totally abandoned
+ Reduced period of building and assembling works

Easy transportation and storage

Cross-section diameter, mm	Linear meters in a bundle	Bundle dimensions (m)	Volume of 1 bundle (m^3)
4	100	0.7*0.7*0.04	0.043
6	100	1.0*1.0*0.05	0.054
6	50	0.9*0.9*0.025	0.024
8	100	1.2*1.2*0.08	0.097
8	50	1.1*1.1*0.05	0.049
10	50	1.8*1.8*0.06	0.150

+ Cost effective delivery of material
+ Shrunk storage space for storing the bars
+ Reduced losses when cut to necessary size

When it comes to a justifying calculation, **Ultimate tensile strength,** being one of the main characteristics of bars, gives economical and process benefit at reinforcing a civil structure through substituting metal bars for equally strong STEKON fiber-reinforced polymer bar of minor diameter.



Packaging: bars may be supplied as packs or bundles. ø4-12mm bars are permitted to be supplied in bundles (50 and 100m in length) tied around with twine or adhesive tape.

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Certificates:

- Certificate of conformity GOST 31938-2012
- Certificate of conformity TU 23.14.12-073-00204961-2016
- NANOCERTIFICA certificate

Regulatory documents:

- Fibre-reinforced polymer bar for concrete reinforcement GOST 31938-2012
- Concrete and reinforced concrete structures. Principal rules. Building code SNiP 52-01-2003
- Protection against corrosion of construction. Building code SNiP 2.03.11-85
- Concrete structures reinforced with fibre-reinforced polymer bars. Design rules. Code of practice SP 295.1325800.2017

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