

BASALT REBAR

Product Description

Basalt fiber is a high performance non-metallic fiber made from basalt rock melted at high temperature. The basalt fiber is then coated with a concrete compatible sizing, and then woven into mat or pultruded with epoxy resin into rebar. The rebar is specially manufactured with a woven Dacron™ relief surface coated with sand for maximum pullout resistance.

Key Features

The key features of Basalt rebar are:

- High strength and low weight
- High corrosion resistance
- High tensile modulus
- Non-conductive and non magnetic
- Easy installation

These are discussed in the following sections.

Strength and Weight

Basalt rebar has much higher tensile strength than steel or fiberglass rebar of the same diameter. For example, No. 5 steel weighs about 1 lb per foot; whereas No. 5 Basalt weighs one-third as much and is 2.2-times the tensile strength of steel. In effect, No. 3 Basalt (10 mm) can replace a No. 5 – 60 series steel. Factoring in weights and tensile strength, Basalt™ rebar is 12-15% the weight of steel. Our recommendation is to use a tighter grid of Basalt rebar of finer diameter



to obtain the best cost-to-performance. Being 8-10 times lighter than steel, Basalt is much easier to install.

Corrosion Resistance

Basalt does not rust or absorb water, so the depth of concrete cover can be reduced, allowing for thinner sections and more flexibility of design.

Basalt rebar is perfect for pervious concrete or applications where concrete is exposed to marine environments or areas affected by road salt. Basalt is naturally resistant to alkalis and will not act as a conduit for moisture.

Tensile Modulus

Since Basalt is so strong in tension and compression, it cannot be bent or formed like steel. If tensile modulus issues arise, modifying the Basalt rebar adding more basalt in finer diameters in tighter grids closer to the surface will overcome any tensile modulus issues. Basalt rebar has the same thermal coefficient of expansion as concrete.

Non-Conductive and Non-Magnetic

Basalt does not conduct electricity, which prevents electrolysis, particularly in hydraulic structures or marine applications. It is also non-magnetic, so it will not induce fields when exposed to RF energy — a plus for applications like MRI rooms and around RFID readers.



Installation

Basalt comes in lengths of 39' 6", or in continuous coils 500 feet long that can easily be lifted by one man. The material can be easily cut in the field, but it is not bendable in short radiuses. An exposed piece of Basalt cannot be used to lift a panel, as it would snap off with a clean break. To demonstrate this, place Basalt Rebar in a vise and attempt to bend it. Eventually, it will either snap off cleanly, or return to the straight position when the force is removed. Uncoiling rolls should be done from the inside, exercising great care to prevent instant uncoiling.

Specifications

Basalt rebar was developed after ACI 440.6-08 was published, so Basalt was not mentioned. ASTM testing of Basalt indicates full compliance with ACI

performance requirements. The physical properties of Basalt™ fall between fiberglass and carbon. Basalt smaller diameter rebar generally has higher tensile strength in modulus than larger diameters, as shown in **Table 1**.

Storage

Avoid prolonged storage in direct sunlight.

Standard Packaging

- Lengths 39 ft 6 in.
- Coils 500 ft

Health & Environmental Data

Please refer to the Material Safety Data Sheet.

Table 1. Physical Properties

Diameter (mm)	Wt per 40' (lbs)	Shear Strength (MPa)	Ultim Tensile (MPa)	Tensile Modulus (GPa)	Elongn at Break %
8 mm No 2	3.7	201	1200	57	2.24
10 mm No 3	4.85	208	1160	56	1.95
12 mm No 3	9.47	219	1155	55	1.88
16 mm No 5	18.37	225	1120	52	1.31

Table 2. Chemical Properties

Rebar is 80% Basalt, 20% epoxy, Dacron, and Sand					
Basalt Composition (%)					
SiO ₂	53	CaO	8.5	K ₂ O	1.5
Al ₂ O ₃	17	MgO	4.5	TiO ₂	1.4
Fe ₂ O ₃	10	Na ₂ O	3.3	Other	0.8

Table 3. Thermal Properties

Parameter	Value
Service Temperature	270-650°C
Softening Temperature	1050°C
Thermal Conductivity	0.035 W/m ² K
Tensile Strength Retained, 200°C	95%
After Exposure to Heat, 400°C	82%
Weight Loss, boiled 3 hr, 2N HCl	2.2%
Weight Loss, boiled 3 hr, 2N NaOH	6.0%

Table 4. Comparison of Properties of Basalt with Other Fibers

Property	Basalt™	E-Glass	S- Glass	Carbon	Aramid
Density, g/cm ³	2.7	2.56	2.54	1.78	1.45
Tensile St, MPa	38-4800	31-3800	40-4600	35-6000	29-3400
Elastic Mod, GPa	93-110	72-75	83-86	230-600	70-140
Elong @ break, %	3.1	4.7	5.3	1.7	3.1

For more information on Basalt products, please contact your PPC representative or visit our website"

www.provenperformancechemical.com

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