

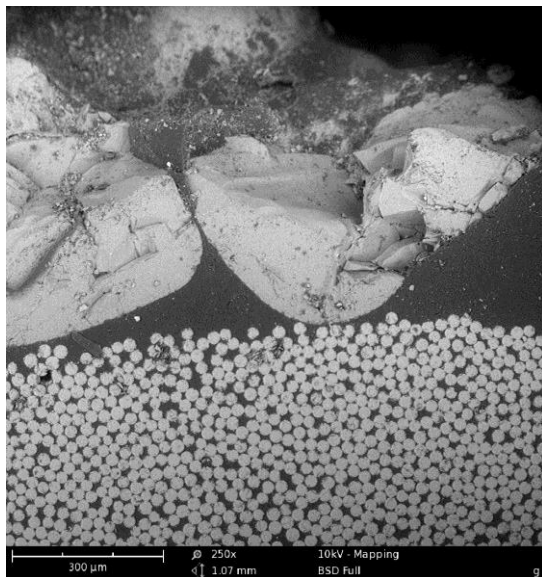
ORLITECH mesh is resistant to corrosion and UV radiation, it doesn't change its mechanical features moreover, due to the high alkali resistance and anti-corrosion properties (resistance to sulphates), the working life of concrete elements is greatly increased, making it ideal for use in marine or chemically aggressive areas.

The mesh does not conduct electricity and is non-magnetic, it does not absorb static and is redundant to radio waves, making it appropriate for the construction and refurbishment of housing, hospitals and airports.

**Durability, resistance to corrosion, alkaline & acid substances, stable condition of the material** – are the most important properties of our basalt fibre reinforced polymer material (FRP). All of our FRP products have a service life in excess of 100 years.

**Thermal conductivity** (100 times lower than that of steel). thermal conductivity  $0.46\text{W/m}^2$ . Due to the high thermal conductivity of steel bars used for construction when they are substituted with Orlitech FRP products thermal conductivity of any connecting steel through the thermal envelope is reduced by 35%

Orlitech BFRP (Basalt Fibre Reinforced Polymer) is manufactured from at least 80% basalt fibre which is totally inert with no other additives. The binder is generally an epoxy resin. Orlitech BFRP bars are manufactured using a pultrusion process and the innovative technology is within the die head where each strand of fibre is coated with the epoxy resin as shown in this microfiche



The larger items in the picture are grains of sand. It has been recognised in many research papers that sand coated BFRP bars results in an increased bond strength to the surrounding substrate.

BFRP does not yield in the same way as steel – when high tensile steel rebar reaches its yield (around 500MPa) it continues to elongate. Elongation prior to the yield point is around 0.25%. BFRP elongates to the point of rupture (>1200MPa) elongation at rupture is between 2.2 and 2.8%.

This Youtube link demonstrates the rupture of BFRP bar  
<https://www.youtube.com/shorts/eyg4iSVTuFM>

Technical characteristics	BFRP rebar	GFRP rebar	Steel rebar
Nominal yield stress, MPa	NA	NA	276-517
Tensile strength, MPa	1300	1000	590
E-modulus, GPa	52		200
Elongation at rupture, %	2.8		6-12
Linear expansion thermal coefficient, $10^{-6} \text{ }^{\circ}\text{C}^{-1}$	6-10		11,7
Glass transition temperature, $^{\circ}\text{C}$	147,6-147,8		NA
Thermal conductivity, $\text{W}/(\text{m}^{\circ}\text{C})$	< 0,46	< 0,56	56
Density, $\text{g}/\text{cm}^3$	2,0		7,9
<b>Safety indicators:</b>			
Electrical conductivity	dielectric		electrically conductive
Magnetic characteristics	non-magnetic		magnetic
Corrosion and chemical resistance	very high	high	low

BFRP bars can be bent but only during the production process. Examples of bent bars:



Currently there is no BS or EN for Basalt FRP bars for reinforced concrete, however we do have a National Technical Certificate and certification to ASTM D7957 which can be viewed [here](#) (hyperlink)

For more detailed information our presentation can be viewed [here \(hyperlink\)](#)

We can offer calculations for reinforced concrete using FRP using ACI 4401R.

Design codes for FRP reinforced concrete

American Concrete Institute: ACI 4401R

Task Group 9.3: Fib 40

Institute Structural Engineers: Design Guidelines for FRP Reinforced Concrete Structures

Orlitech composite basalt FRP mesh has many and varied applications including but not limited to:

### **Civil Engineering**

Strengthening of concrete structures

Reinforcement of concrete wall, concrete panels and sandwich panels

Reinforcement of concrete floors and ground bearing slabs

Sea defence walls

Water treatment works

### **Industrial Construction**

Reinforcement of industrial concrete floors

Reinforcement concrete within water treatment plants

Reinforcement of concrete sea defence structures

Reinforcement of anhydrite flowable screeds

Reinforcement of masonry within mortar joints

### **Road Construction**

Continuously Reinforced Pavements

Dowels for movement joints

Reinforcement of bridges

Strengthening of road and railway embankments

Crash barriers

### **Pre-Cast Concrete**

Fence posts & gravel panels

Water troughs  
Cable trays  
Shield panels  
Copings  
Retaining panels/walls

For ground bearing slabs we have commissioned a report which details the calculation method using ACI 440 and gives a comparison to current UK design standards a copy of which is available to view [here](#).

In respect of cost & quality, BFRP provides all industries with a competitive material which can provide a cost effective solution for 21<sup>st</sup> Century manufacturing. A combination of excellent material characteristics opens new possibilities of use in all areas of construction and manufacturing. Taking this into consideration, Orlimex continues to develop innovative products for all industries. New products which are due to be introduced to the market are rock bolts and composite pultruded profiles such as safety barriers and handrails.