

Continuous basalt fibre: production development and new products

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Kamenny Vek has been producing continuous basalt fibre under the brand name Basfiber® for more than 10 years. Over that time, technological process and equipment have been significantly modernized and now the company is manufacturing products with improved properties and better processability in comparison with basalt fibre produced by other manufacturers, and even with the fibre that it produced just a few years ago.

Basfiber® products are manufactured directly from rock of volcanic origin without any chemical additives. A special combination of iron and aluminium oxides ensures improved properties as compared to glass fibre, but at the same time requires innovative production technologies and sophisticated equipment (figure 1).

Kamenny Vek's basalt fibres show 15-20% higher tensile strength and modulus, better chemical resistance, extended

operating temperature range, better environmental friendliness than regular E glass - all in one material - getting close to and sometime outperforming high strength glass and other specialty fibres but beating them price wise. Basfiber® is ideally suited for demanding applications requiring high temperatures, chemical resistance, durability, mechanical strength and low water absorption (figure 2).

Processing of basalt fibers does not require special equipment or technologies - all known processes such as pultrusion, filament winding as well as conversion into regular textile, non-woven, UD and

multi-axial fabrics can be used (figure 3).

The basalt fibre offered by different manufacturers is produced from basalt rock of different chemical compositions and various technologies are used for its production. This means that the properties of basalt fibre can significantly differ depending on the manufacturer. Kamenny Vek's Basfiber proprietary technology is similar to glass fibre production technology and involves the use of large furnaces with a production capacity up to 2500 MT/year. This makes it possible to strictly control the melting and drawing temperature ranges and

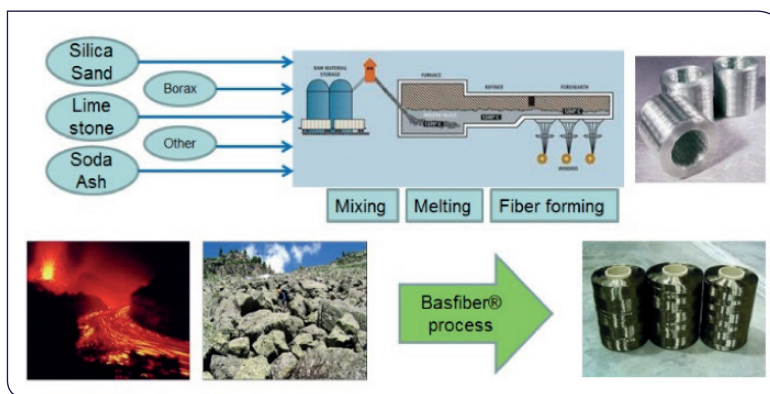


Fig. 1: Comparison between glass fibre and Basfiber production process

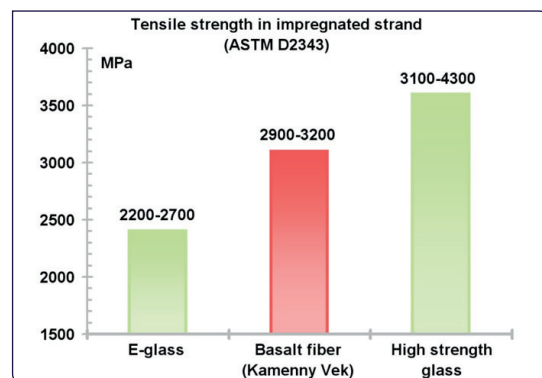


Fig 2: Comparison between Basfiber, E-glass and high strength glass



Fig.3: Composite panels and fabric made with Basfiber



Fig.4: Production of basalt fibre



Fig. 5: 2400-tex direct roving for pultrusion compared with assembled roving and twisted yarn

provides a stable process (figure 4). The special andesite-basalt raw material used in production together with a unique technology ensures high mechanical properties of the fibre, with lower variability than basalt fibre produced by other manufacturers. The company uses large-sized bushings.

While other basalt fibre manufacturers can produce single-end roving of maximum 600 tex, Kamenny Vek has a full-scale production of high quality, inexpensive 1200-tex single-end roving. In the very near future, it will start the production of 2400-tex single-end roving, which is great news for customers using pultrusion technology (figure 5).

Some large tex rovings, such as 2400 and 4800 tex, are still produced in the form of assembled roving. However, specially designed equipment makes it possible to produce it with almost zero catenary. This equipment can produce an assembled roving that is similar to a standard glass fibre direct roving in terms of bobbin type, tex and catenary.

The company recently finished the development of new sizings that secure a higher level of alkali resistance and excellent compatibility with a wide range of resin systems.

Applications

The use of Basfiber® in their products enables our customers to patent new technical solutions and, sometimes, to get around the existing patents that suggest the use of glass fibre. Currently, Basfiber® is successfully used in various projects in the automotive and construction industries, industrial applications, sporting goods production, etc. For instance, the use of Basfiber® for the reinforcement of the middle layer of 3-layer polyolefin hot water pipes has made it possible to improve the physical-mechanical properties, quality and reliability of the product and to patent the use of basalt fibre in this application. The use of composite materials made from Basfiber® fabric in electric machines that operate in high temperature and moisture conditions makes it possible to replace steel components and, therefore, to reduce the weight and price of the products while enhancing their performance and reliability. New products have been successfully patented.

Thanks to their high heat resistance,

New Pultrusion focus

Kamenny Vek's has full-scale production of high quality and inexpensive single-end Basfiber® roving of 1200 tex and in March 2016 will begin the production of the single-end roving of 2400 tex which is particularly a great news of customers using Pultrusion technology.

Basfiber®-based products are becoming widely used in the automotive industry including applications such as brake pads and thermal insulation of exhaust systems as well as in the under-hood space where the temperature exceeds 200°C.

The use of Basfiber® fabrics in cosmetic applications looks very promising – the attractive appearance of the panels produced from such fabrics competes with carbon fabric panels while being more attractive pricewise. Basfiber®-based fabrics have already been used in various sporting goods and other products to create an attractive hi-tech appearance.

Most recent technological achievements in the production of 1200- and 2400-tex single-end Basfiber® rovings open the door to the huge pultrusion market as well as UD tape and multiaxial fabric production for the wind energy and other sectors.

Conclusion

Constant investments in research, development and innovations made in recent years significantly extended the range of products and application fields for Basfiber®. More and more companies around the world are improving the competitiveness of their products by successfully implementing this basalt fibre as a replacement for the traditional materials they previously used in their projects. ■

More information: www.basfiber.com

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The company will participate in JEC World 2016 and invites you to visit its booth (R45), where you will have the opportunity to see product samples, including 1200- and 2400-tex single-end rovings, and get answers to your questions.