



ISOMATEX S.A.
Advanced Fiber Manufacturer

FILAVA

FILAVA™ is a direct roving made of enhanced volcanic rock filaments and manufactured in the melt spinning process, where the fibers are formed via a batch melt, followed by the lava which flow through bushing plates with nozzles and then vitrified by cooling.

FILAVA™ roving is a unique product thanks to a genuine and innovative treatment of the raw material, volcanic rock, which being the major ingredient, is aggregated and enriched with various mineral additives with the aim to increase and guarantee its original mechanical and chemical properties as well for maintain the evenness of the required mechanical properties. The components used in the batch aggregation and the fabrication process are ISOMATEX's know-how and constitute its exclusive expertise.

Single-End and Multi-End assembly direct rovings consist of thousands of continuous filaments with elementary diameters from 9,0 to 11,0 µm. bonded into a single strand and wound onto a cardboard sleeves. A specially developed by matrices' type sizing is applied on the fibers, which assures an excellent infusion and resin-to-reinforcement adhesion.

FILAVA™ is unique due to its high strength, high elasticity and resistance to high temperature as well as to temperature's variation (contrarily to carbon which does not like thermal shocks). This compares well to existing high-end products (R - glassfibers, S - glassfibers). In addition and as noted above **FILAVA™** is always better in a chemical and alkaline environment, which gives it often a definitive advantage (for instance water and concrete is alkaline, which makes other high-end products not so suitable whenever the fiber is in contact with such elements).

Applications and downstream processing. **FILAVA™** rovings are designed to be used in applications requiring high mechanical properties, well wet-out and high infusion with organic matrices, where excellent processing is necessary, in thermoset matrices like epoxy resin, polyester, vinyl ester as well as in many thermoplastic systems. **FILAVA™** has very low catenary with smooth unwinding behavior throughout the package and has low fuzz properties that will result in smoother parts, less clean-up and improved machine efficiencies in downstream processing. Typical applications include weaving, braiding, high speed knitting, filament winding, UD-impregnation and pultrusion, chopping, ...etc.

High mechanical properties such as Tensile Strength and Young modulus (elasticity), elongation and resistance to high temperature, chemical and alkali-resistance offers a unique combination of properties making **FILAVA™** completely compliant to the technical requirements of such high-end applications.

The applications where **FILAVA™** is used are basically endless ...

Packaging. Standard packaging includes cylindrical bobbins with felt- or embossed surface sleeves. The inner diameter of cardboard sleeves is 76,0 mm., the height: 260 ... 300 mm. Bobbins are individually labelled and wrapped with stretched plastic film for protection and improved handling. Nominal weight for commercially available bobbins is in range of 5,0 up to 7,5 kg.

Storage and usage conditions. ISOMATEX recommends storage in a cool and dry warehouse into the original packaging. For an optimal processing we recommend to use the product in ambient conditions (20 - 23 °C, 60 - 65% Relative Humidity).

FILAVA™ roving need to be kept in the workshop at least 24 hours prior usage.

Product description: Continuous filament made of enhanced mineral volcanic rock (aggregated and enriched batch). The rovings are treated with “by-matrices or by-process” sizing system for excellent downstream treatment and transformation’s performance as well for high adherence in compliance with the concerned matrices.

Article reference: **Multi-End (assembled) direct roving**, ex.: MEDR BSB3.7 1600-80(10) IS65T CS01E

Strand type (Single or Multi-End Direct roving)	_____	_____	_____	_____	_____
Batch composition’s reference	_____	_____	_____	_____	_____
Linear density in TEX (gr/km), <i>see below</i>	_____	_____	_____	_____	_____
Linear density in TEX of constituent single-end roving	_____	_____	_____	_____	_____
Diameter of virgin (elementary) filaments (µm.)	_____	_____	_____	_____	_____
Sizing reference (*)	_____	_____	_____	_____	_____
Cardboard sleeve, embossed or felt surface, for external unwinding	_____	_____	_____	_____	_____

(*) Do not hesitate to get in touch with ISOMATEX Sales department for more information

Linear density (TEX) available:

Single-End Direct rovings : 68 TEX (gr/km) nominal diameter of virgin fibers Ø 9,0 µm.
 81 TEX (gr/km) nominal diameter of virgin fibers Ø 10,0 µm.
 100 TEX (gr/km) nominal diameter of virgin fibers Ø 11,0 µm.

Multi-End Direct rovings: a multiple of Single-End direct rovings up to 2.400 TEX with very low catenary
 Coefficient of variation of linear density, %: less than 3,0%

Sizing: Engineered for high-end structural or high thermal resistance applications and compliant to different organic and/or ceramic matrix materials being considered especially as alternative fiber reinforcement to carbon or alumina.

Content, % weight (Loss of ignition): 0,4 – 1,0 % (according to customer’s request)
 Moisture content, % weight: less than 0,1 %
 Resin (matrix) compatibility: epoxy, polyester, vinyl ester, PA, PP, PEEK, BMI, ...etc.

Physical properties: Volume density (ASTM C693): 2,600 gr/cm³
 Poisson ratio: 0,24

Mechanical properties:

- Sized and dried rovings, according to ISO 3341:2000:
 - Tensile strength: 66 80 cN/tex
 - (depending on the sizing formulation): 1.580 ... 2.000 MPa
 - Elongation at break: 2,10 %
 - Tensile modulus (Young or E-modulus) : 90 ... 100 GPa
- Impregnated strand, according to ASTM D2343 or ISO 9163:2005:
 - Tensile strength: 3.400 ... 3.600 MPa
 - Tensile modulus (Young or E-modulus): 86 ... 97 GPa

Thermal properties (according to DIN ISO 7884):

- Melting point: 1.560 °C
- Transition temperature: 730 °C
- Softening point: 940 °C
- Annealing point: 740 °C

Linear coefficient of thermal expansion 20°...300°C, CTE (ASTM D696): $3,72 \dots 4,9 \cdot 10^{-6} / ^\circ\text{C}$

Chemical resistance (Weight loss % after boiling during 3 h):

- H₂O: 0,51 0,7 %
- 2N NaOH: 4,65 %
- 2N HCl: 3,53 %

Thermal resistance (% of residual values (after 24 h ageing):

- - 200 °C: 100%
- 200 °C: 100%
- 850°C: 40%



DISCLAIMER OF LIABILITY

The above shown data is presented solely as a guide in the selection of a fiber reinforcement. The information mentioned in this leaflet is based on actual ISOMATEX' laboratory data and field test experience. Because of numerous factors in downstream processability affecting results, we consider this information to be reliable, but do not guarantee its applicability to the user's process or assume any liability arising out of its use or performance. The end-user, by accepting the products described herein, assume the responsibility for thoroughly testing any application to determine its compliance before committing to production. It is important for the end-user to determine the properties of its own commercial compounds when using this or any other fiber reinforcement. WE MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. STATEMENTS AND DATA IN THIS DOCUMENT SHALL NOT BE UNDERSTOOD AS REPRESENTATIONS OR WARRANTIES OR AS INDUCEMENTS TO INFRINGE ANY PATENT OR VIOLATE ANY LAW, SAFETY CODE, OR INSURANCE REGULATION.