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ISOMATEX's **non crimped (NCF) Quadriaxial fabric** is made out of 4 layers of unidirectionally placed FILAVA™ direct rovings oriented at 0°, -45°, 90° and +45° respectively. The layers then are stitched together by a polyester yarn, rather than woven, so there is no crimp in the rovings according to the sketch below.

Consequently, these reinforcements offer equalized and homogeneous directional strength for structural composite applications, showing no distortion of the constituent yarns. Therefore, they are successfully used in the nautical, defense, building & construction, rail and wind energy industries.

With a good wettability behavior, our NCF quadriaxial fabrics are extensively used for processes where a great mechanical strength combined with visual quality finishes are required, like hand lay-up, injection or infusion molding and RTM composite processes. Due to the genuine and tailored sizings applied on the fibers during the stretching process, non-crimped multi-axial fabrics are ideally suited for a wide range of reinforcements and are compliant to any type of thermosetting matrices like polyester, Vinylester and epoxy or thermoplastic resins like PA6, PA11 or PPA (polyphthalamide), ...etc.

NCF Quadriaxial fabrics has unique properties for high-end composite materials thanks to their non-crimp construction and multi-axial stable configuration. It ensures the most critical and essential request for such structural applications: strength control and retaining of the alignment of the reinforcing fibers during plastic molding. The material also offers improved path-structure for organic matrices impregnation via the stitching holes while the roving's orientations are always homogeneously distributed.

**Key benefits of multi-axial fabrics:**

- Fiber, surface density and orientation are ideally adjusted:** The roving's positions are specifically aligned to the required quantity and orientation in the loading direction.
- FILAVA™ fibers for optimum mechanical strength:** Non-crimp construction which retains the stability of rovings in all directions. Without any fibers-in-layer's distortions, they can absorb the highest possible loads through stretched fibers. Each layer's weight is optimized whilst maintaining equal mechanical properties or even a higher component load with the same surface density.
- Infusion and outstanding wettability:** Thanks to by-matrices specially developed sizings, the infusion of our multi-axial fabrics is tailored to customer requirements and exhibits outstanding wettability.

As a reminder, 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 due to a genuine and innovative treatment of the raw material, mineral natural rock, which being the major ingredient, is enriched with various mineral additives with the aim to increase and guarantee its original mechanical and chemical 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 cardboard sleeves. A specially developed by matrices' type sizing is applied on the fibers, which assures an excellent infusion and resin-to-reinforcement adhesion.

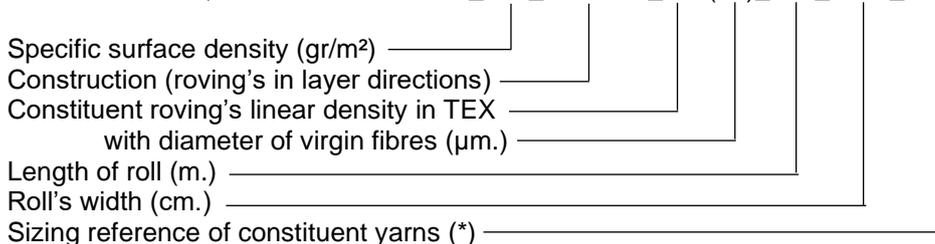
**Storage and usage conditions.** ISOMATEX recommends to store all of its articles in a cool and dry warehouse into the original packaging. For an optimal processing we recommend to use the product in ambient conditions (20 - 23°C, 60 - 65% Relative Humidity).

Articles need to be kept in the workshop at least 24 hours prior usage.



**Product description:** Non crimped (NCF) Quadriaxial fabric fabrics made of FILAVA™ continuous filament with 4 layers of unidirectionally placed direct rovings oriented at 0°, -45°, 90° and +45° respectively suitable for structural composites whilst absorbing the highest possible loads. The layers are stitched together by a polyester yarn.  
(see ISOMATEX Sales department for more information)

**Article reference:** NCF Quadriaxial, ex.: NCF QF BSB3\_400\_45/90/45\_100(11)\_150\_0127\_IS65T



(\*) see ISOMATEX Sales department for more information

**General type of supply:**

With surface density from 400 up to 1.200 gr/m<sup>2</sup> NCF Quadriaxial FILAVA™ fabrics (0°/+45°/90°/-45°) with fabric's roll width of 127 cm. supplied rolled on the cardboard sleeves, wrapped and packed in cardboard boxes.

**Properties:**

Volume density of constituent yarns (according to ASTM C693): 2.600 gr/cm<sup>3</sup>  
Specific surface weight: from 400 up to 1.200 gr/m<sup>2</sup>

**Thermal properties** (according to DIN ISO 7884):

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

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

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

**Sizing:**

Engineered for wide range of thermoset and compliant to different organic matrices like epoxy, polyester, vinyl ester or thermoplastic resins like PA6, PA11 or PPA, ...etc.

Content, % weight (loss of ignition, LOI): 0,4 – 1,0 % (according to customer's request)  
Moisture content, % weight: less than 0,1 %

**Further characteristics of fabrics:**

Construction (layer's pattern or roving's orientations): 0°, -45°, 90°, 45°  
Stitching thread: synthetic, mainly texturized polyester (6,0 gr/m<sup>2</sup>) with stitching pattern: tricot-warp  
Stitch length: about 2,0 mm. (with tolerance of ±5,0%)

**Packaging:**

Width (m), nominal: 1.270 mm.  
Length (m): full package is about 400 m. roll

The rolls are individually labelled in the cardboard sleeve and wrapped with stretched plastic film for protection and improved handling.

**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.

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