

Extremely Solid and Ultra Light Tie Rods Made of High Performance Composite Fibers

With the Austrian company Teufelberger Composite GmbH, HIRSCHMANN has at its side the ideal partner for realization of their innovative products for aerospace industry. The company has decades of experience in development and production of fiber ropes and manufactures for HIRSCHMANN innovation the Tie Rods als linking elements between lightweight spherical bearings. These extremely resistant stabilizer bars consist of a meshwork of high performance composite fibers such as carbon, glass or aramid. For the manufacturing of the preform TEUFELBERGER relies on braiding technology, allowing precise braiding of hollow bodies.

The braiding process for composite fibers is done by so called radial plaiting machines. In these machines the composite fibers are departed in controlled angles and in several layers with the help of specially designed bobbins on a braiding core moved through the machine by a robot. Additional fibers in longitudinal unit direction (UD filaments) are placed over the machine circumference along the axis of the braiding core. The forming hose exactly covers the shape of the braiding core and a preform is made, that already corresponds to the final contour of the component to be made. The braiding technology is predestined for automated manufacturing of multilayer, three-axial hollow meshes made of composite fiber materials and allows the production of various component geometries near to final contour. For an optimum strength resin is injected into the mesh in RTM process (Resin Transfer Moulding).

So called hybrid meshes – different types of fibers within one mesh layer – are a special feature of Composite braiding. Because the mesh is closed completely only on the component surface, it is possible to add additional elements as the patented T-IGEL[®] connecting technology.

HIRSCHMANN

SPHERICAL BEARINGS

Into the joint elements with T-IGEL[®] connection, made by 3D-printing in titanium, later on the aluminum-titanium spherical bearings are pressed and rolled in by HIRSCHMANN. Further on in production process of the Tie Rods the core braided with composite fiber materials is solved and washed out in a water quench. The result of this process are ultra light, hollow inside but nevertheless extremely resilient Tie Rods.

The stabilizer bars are available in different lengths and diameters. A special program calculates due to the application, where the highest forces should be transmitted – this point is basis for material thickness. Available are units with a diameter from 25 to 300 mm at length up to 15 m. Depending on component diameter, machine size and type of composite fiber braiding angle in the range of [-25/25]° up to [-85/85]° can be realized.



Automatic Wrapping of Tie Rods.

Photo: TEUFELBERGER Composite GmbH

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About HIRSCHMANN

For more than 60 years HIRSCHMANN develops and manufactures trendsetting products amongst others for vehicle construction, motor sport, aerospace, railed vehicles, mechanical engineering, naval architecture and wind power plants. Core competences lie in the three product lines Rod Ends and Spherical Bearings, Rotary Indexing Tables and Reference Systems. In these sectors HIRSCHMANN has extensive expert knowledge as well as experience for decades and can offer beside a varied standard assortment also customer-specific solutions. The medium-sized enterprise from Baden-Württemberg with sales companies in US and China actually has about 200 employees.