Most Comprehensive winding and testing solutions to ensure the highest quality fiber coils

Start with a proprietary winding system

Our specially designed winding machine and specially formulated potting adhesives, combined with our proven winding process, enable the production of fiber coils of the highest quality.

On-line tension regulation

With our proven winding process, enable the production of fiber coils of the highest quality.

Automatic Winding Machine

Tension feedback system

On-line tension regulation—with a tension reading resolution of ±1 gram, our proprietary tension regulator to be precisely control the winding tension down to 1 gram, ensuring the coil stays smooth during winding, minimizing the lowest polarization crosstalk of the resulting coils.

Proprietary potting adhesives—By relating our coil production data over the last four years, we formulated this special adhesive that balances the temperature and environmental performances of the fiber coils, while maintaining high performance.

Backed by comprehensive testing capabilities

Our comprehensive testing capabilities, combined with our in-depth understanding of polarization and the Shupe effect, enable us to turn the making of fiber coils from art to science, ensuring that every coil produced meets our high quality standards and comes with a test data set that fully characterizes the coil.

Proprietary potting adhesives—By relating our coil production data over the last four years, we formulated this special adhesive that balances the temperature and environmental performances of the fiber coils, while maintaining high performance.

This patented instrument can accurately measure the spatial resolved polarization crosstalk induced by winding stress with a resolution of 0.1% revealing much more information about the winding quality of the coil than can be obtained from a PER measurement.

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3D tomographic coil analysis, to ensure highest winding quality, pioneered by General Photonics

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Other General/Photonics Polarization Measurement Instruments

PSGA Polarization Measurement System

Fiber Coil Transient Effect Analysis System (FCTEAS)

Mainly used for testing the reciprocity of fiber coils. The data collected is coil’s transient performance, such as the rate at which the coil can be used to spin the fiber coil to optimize performance.

Other General/Photonics Polarization Measurement Instruments

PSGA Polarization Measurement System

Fiber Coil Transient Effect Analysis System (FCTEAS)

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Polarization Extinction Ratio Meter

Polarization Dependent Loss Meter

Distributed polarization crosstalk analyzer (DPCA)

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Superb optical reciprocity

Optical reciprocity is a key performance parameter of a fiber coil and it determines the final accuracy of the resulting fiber optic gyro. GP’s coil production system, including winding machine, potting adhesives, and production process, ensures that the final PER is the same as the theoretical analysis, enabling us to continue to improve our quality and make high performance fiber optic gyros.

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The polarization performance of the sample used in a fiber gyro, whether it is a PM or SM fiber coil, directly affects the gyro’s performance.

General Photonics provides the most complete test suite of the fiber coil's optical performances including the coils, which allows the high performance of the resulting fiber optic gyros and current sensors incorporating such components.

Reliability test:

General Photonics can also perform the following reliability tests for the coils:

- Swept and random frequency vibration
- High/low temperature
- Shock test
- High/low humidity
- Step temperature variations at 1 °C/min
- Rate errors of a coil under temperature transients before and after trimming
Types of fiber coils

- Quadrupole
- Hexapole

Typical winding patterns

- Winding IL: <0.3dB/km
- Distributed polarization crosstalk
- PER variation over a 120°C temperature range: <3dB

PM fiber coil:

- Number of layers (C): 150 max.
- Number of turns (Z): 300 max.
- Coil height (H): <100mm
- Inner diameter (ID): <220mm
- Outer diameter (OD): >20mm
- Fiber length L: 6km max.

Performance parameters

- DOP
- PDL
- PMD

Geometrical parameters

- Fiber length L: 6m max.
- Outer diameter (OD): 220mm
- Inner diameter (ID): 150mm
- Number of layers (C): 150 max.

Precision Fiber Coils for Fiber Optic Gyro (FOG) and Other Fiber Optic Sensors

Polarization is a critical parameter in fiber optic sensing systems, such as fiber optic gyroscope (FOG) and fiber optic current sensors. A fiber coil is a key component in such sensing systems, and its quality directly limits the performance of the sensing systems. Until now, winding fiber coils has been an art, relying on the magical hands of a few skilled technicians. Minimal test exist for the characterization of the quality of a coil, making it extremely difficult to ensure the performance of the coils when delivered to the customers.

As the world leader in polarization management, General Photonics is uniquely positioned to solve such a problem. We have devoted significant effort over the past 10 years to finding solutions for complete characterization of the fiber coils. Aided by these testing capabilities, we further developed a cost productive system, including the proprietary fiber winding machines, specially formulated adhesives, and proven winding processes to ensure high quality coil production.

We are proud to announce that coil winding is no longer an art, but a science, and that customers can be assured that every coil they purchase meets the demanding performance requirements of their FOG or current sensors.

Visit our website to see the list of our off-the-shelf coils. Feel free to contact us if you have other requirements as to the length, OD, ID, and height of the coils. No particular specification or other information is required. We are confident that the coils we provide with our specifications will meet or exceed your performance requirements.