Recommended Best Practices for Measuring Optical Fiber on a Shipping Spool

Application Note

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Optical fiber products are mainly used in cabled form for telecommunications. For these applications, the bare fibers are placed into protective cables, typically in a tension-free state, where the optical attributes are measured to confirm and support system functionality. In laboratory and cable production environments, the optical fiber is measured while wound on its original shipping spool.

Engineers and scientists rely on shipping spool based measurements for network simulation and to accurately characterize the performance attributes of an individual fiber. Corning Optical Fiber conducts best-in-class measurements and this Application Note discusses specific methods to obtain the most precise measurements when un-cabled optical fiber is deployed on a small shipping spool.

Corning Optical Fiber Delivery Conditions

Corning optical fiber is wound on a 9¼" (23.5 cm) diameter plastic shipping spool. This spool has a flange with a specially designed slot that provides access to the inner end of the fiber in case bi-directional measurements are necessary. The inner fiber end is at least 1 m long and is wound around a small 6" (15.25 cm) lead meter ring. A tiny foam insert is placed within the flange slot to secure the inner fiber end, and to prevent the end from slipping back through the slot. See Figures 1 and 2.

Best Practices for Fiber Deployment

1. Place the spool upright on a clean, flat surface with the protective plastic clamshell intact.
2. Carefully remove the tiny foam insert (a.k.a. slot plug) that holds the inner fiber end in place on the lead meter ring.

Therefore, it is important to remove the slot plug to avoid false measurements. In some instances, the slot plug secures the fiber with enough force that the on-spool attenuation is temporarily increased due to macrobending. Caution: do not allow tweezers or finger nails to contact the bare fiber itself as it could damage the fiber surface or compromise mechanical integrity.

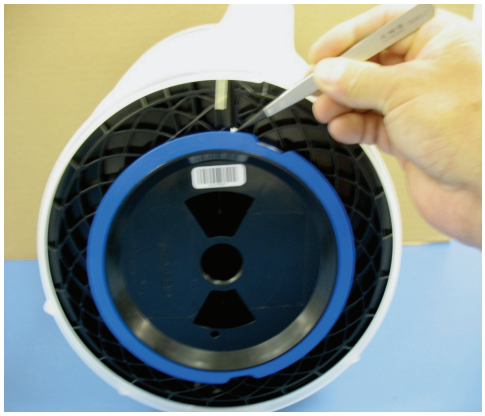

Figure 1

Figure 2

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If the fiber under test is not a bend-insensitive ClearCurve® fiber, then carefully unwrap the lead meter fiber after the slot plug is removed to further prevent or reduce macrobending induced loss. It is also important to not wrap any splice protection sleeves around the lead meter flange as it could cause false elevated attenuation readings due to macrobending effects, see Figure 3.

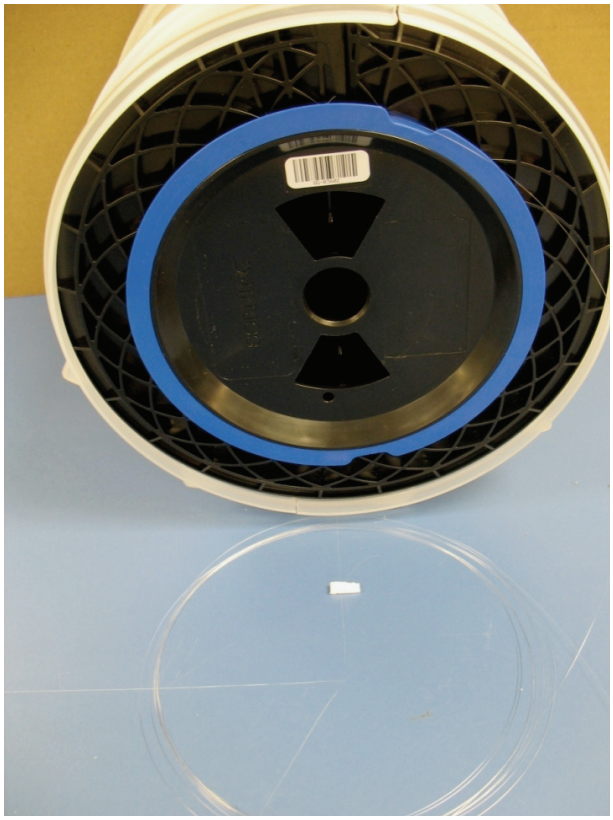

Figure 3

Measuring Optical Fiber On-Shipping-Spool

If an Optical Time-Domain Reflectometer (OTDR) is being used to perform measurements on the shipping spool, measurements from both ends of a fiber should be taken to calculate the true attenuation coefficient of that fiber. The actual attenuation coefficient is calculated as the average of the attenuation measurement in both directions.

The readings from both ends should be similar, in the event that they are very different, please check that the deployment conditions described in "Best Practices for Fiber Deployment" section are followed.

For more information on other common OTDR features, please refer to Corning's White Paper No. 1281, Explanation of Reflection Features in Optical Fiber as Sometimes Observed in OTDR Measurement Traces.

This Application Note is intended to be a brief summary of recommendations. If your applications are different, please feel free to contact our group of experts at cofic@corning.com or 607-248-2000.

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