Corning® SMF-28® Contour Optical Fiber Fusion Splicing Report

Application Note

AN2020
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Objective

In this report Corning tested homogeneous and heterogeneous fusion splice performance of Corning's SMF-28® Contour optical fiber. Compliant with ITU-T recommendation G.652.D, G.657.A2 (SMF-28® Contour Pro), and G.657.A1 (SMF-28® Contour Fit), SMF-28 Contour is Corning's optical fiber solution for density with improved bend resilience and 9.2-micron standard mode field diameter. Splice loss performance across Corning's family of optical fiber products is represented in this report.

Test Plan and Procedure

This splicing study involved homogeneous (same fiber type) and heterogeneous (different fiber type) splices. All fiber splices were completed using a commercially available active core alignment fusion splicer, Fujikura 90S, using a standard pre-set factory program (SM-AUTO). Multiple fibers were used spanning a range of mode field diameter (MFD) values.

For more information on splicing best practices and how to interpret optical time domain reflectometer (OTDR) measurements, please review the following documentation:

- AN3060 - Guidance for OTDR Assessment of Fusion Spliced Single-mode Fibers
- AN103 - Single Fiber Fusion Splicing

Fusion splicers may show a faint grey line after splicing together with homogeneous and heterogeneous optical fibers. Figures 1 and 2 are images of typical homogeneous and heterogeneous optical fiber splices. The faint fusion line associated with the homogeneous splice and the black-white lines associated with the heterogeneous splice are both a result of small refractive index differences created by the fusing process that are detectable by a splicer's imaging system. These lines do not affect the quality of the splice.

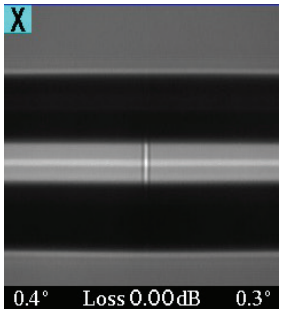

Figure 1. Homogeneous splice

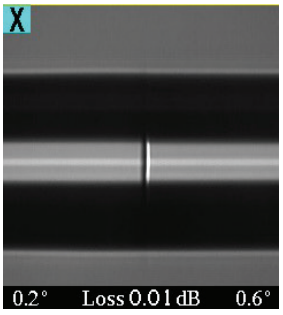

Figure 2. Heterogeneous splice

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The splice loss should be measured by an OTDR from both directions and the average of both measurements calculated, known as bidirectional splice loss. However, in the field, most splice technicians only have access to measure from one direction. To provide guidance, Figures 3 and 4 represent typical unidirectional and bidirectional splice loss at 1310 nm that can be expected when splicing SMF-28 Contour optical fiber to itself and SMF-28 Contour fiber to Corning® SMF-28® Ultra fiber. MFD difference is the primary driver behind the unidirectional losses reported by an OTDR for a homogeneous optical fiber splice.

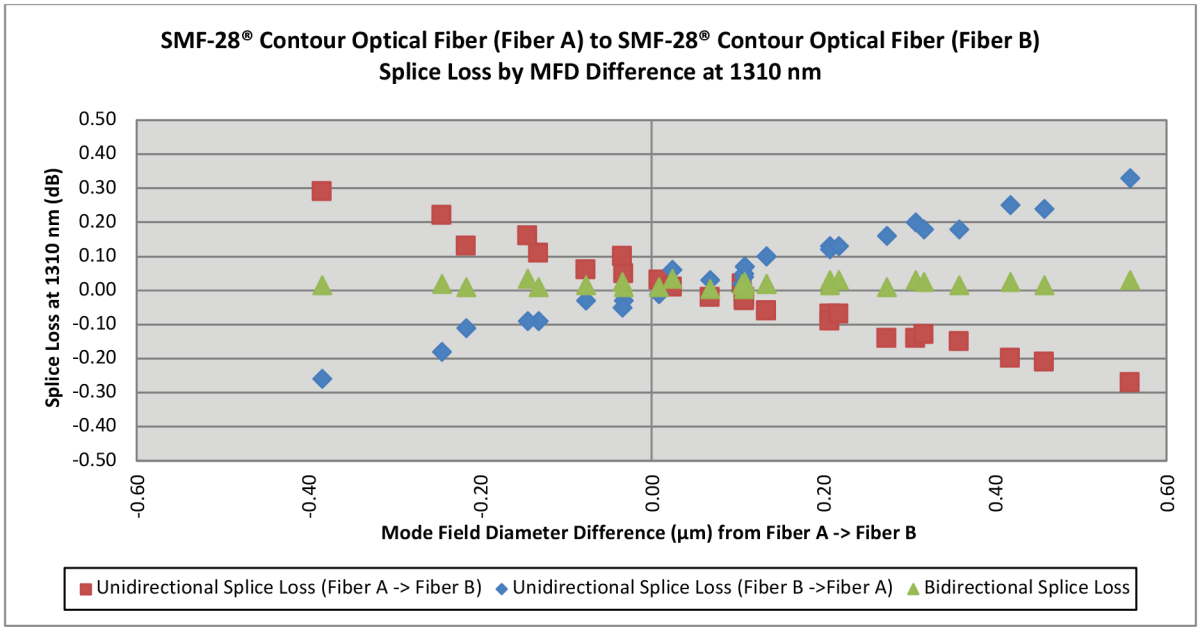

Figure 3. Unidirectional and Bidirectional Splice Loss.
SMF-28 Contour optical fiber to SMF-28 Contour optical fiber.

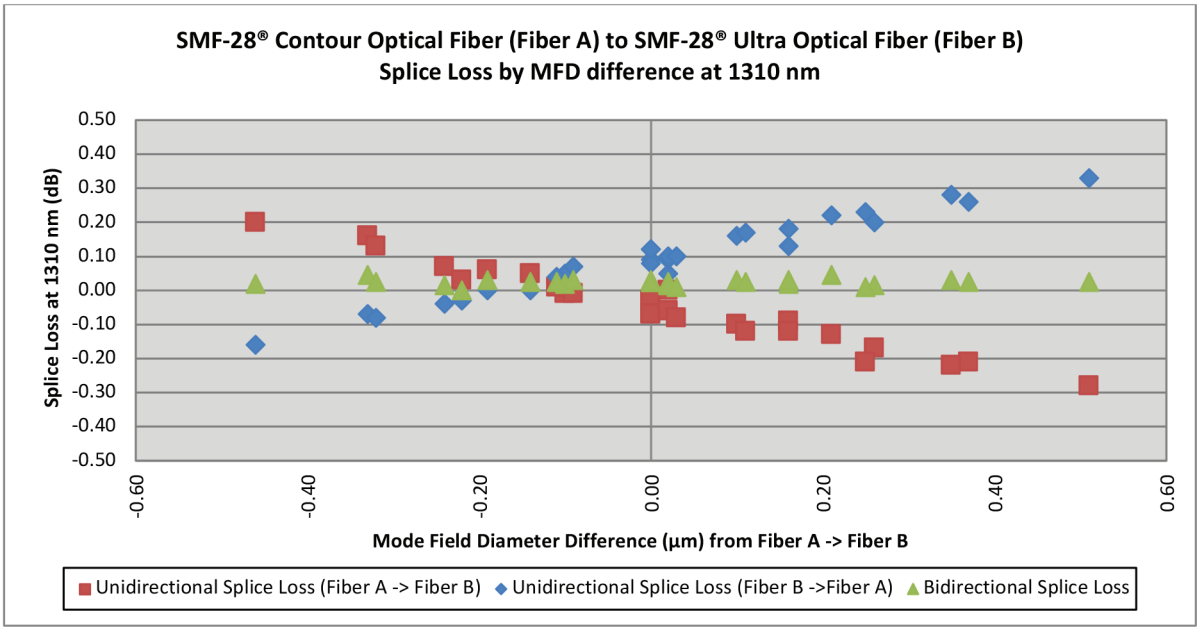

Figure 4: Unidirectional and Bidirectional Splice Loss.
SMF-28 Contour optical fiber to SMF-28 Ultra optical fiber.

Corning® SMF-28® Contour Optical Fiber Typical Splice Loss to Other Corning Optical Fiber Products

To assist our customers when different Corning optical fiber types are being spliced together, we have included splice losses for common fiber combinations.

Fusion Splicer: Fujikura 90S (Core alignment)
Splicer Recipe: SM AUTO

		1310 nm		1550 nm		1625 nm	
Fiber A	Fiber B	Mean (dB)	Max (dB)	Mean (dB)	Max (dB)	Mean (dB)	Max (dB)
SMF-28® Contour optical fiber	SMF-28® Contour optical fiber	0.02	0.04	0.02	0.03	0.02	0.03
SMF-28® Contour optical fiber	SMF-28® Ultra	0.02	0.05	0.02	0.04	0.02	0.04
SMF-28® Contour optical fiber	SMF-28e+® optical fiber	0.04	0.08	0.03	0.06	0.04	0.06
SMF-28® Contour optical fiber	SMF-28® ULL optical fiber	0.03	0.05	0.04	0.07	0.05	0.08
SMF-28® Contour optical fiber	ClearCurve® LBL optical fiber	0.03	0.07	0.03	0.05	0.03	0.06
SMF-28® Contour optical fiber	TXF® optical fiber	0.21	0.30	0.14	0.21	0.13	0.18

Conclusion

This report demonstrates the capability of optical fiber splicing for Corning SMF-28® Contour fibers in both homogeneous and heterogeneous conditions.

For any questions or concerns regarding optical fiber or fusion splicing, you can contact Corning Optical Fiber by phone at 1-607-248-2000 or by email at cofic@corning.com.

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