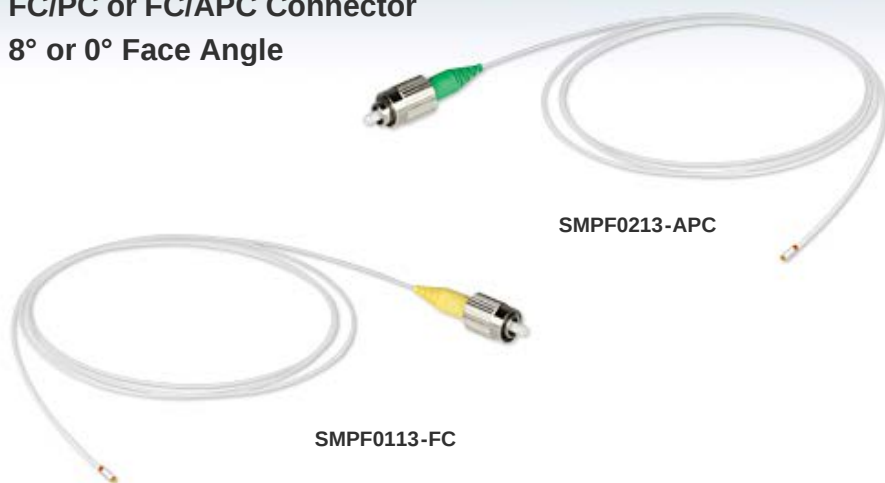


## SMPF0113-FC - September 14, 2017

Item # SMPF0113-FC was discontinued on September 14, 2017. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### SINGLE MODE PIGTAILED FERRULES WITH CONNECTORS

- ▶ AR Coated Ferrules to Reduce Back Reflections
- ▶ Ø1.8 mm Ferrule is Easy to Handle
- ▶ FC/PC or FC/APC Connector
- ▶ 8° or 0° Face Angle



## OVERVIEW

### Features

- AR Coating for 633, 830, 1064, 1310, and 1550 nm or 1310/1550 nm
- FC/PC or FC/APC Connector
- Designed for Easy Pairing with GRIN Lenses
- 8° or 0° Face Angle
- Ideal for Telecom Applications

Thorlabs' Single Mode Pigtailed Ferrules with Connectors are designed to be paired with our GRIN lenses. In contrast to our pigtailed aspheric lenses and jacketed GRIN collimators, this product family allows the combination of GRIN lens and pigtailed ferrule to be individually chosen, satisfying a wide range of experimental requirements. See the image to the right for an example of an assembled device, or use the *Selection Guide* and diagrams below to choose compatible lenses and pigtailed ferrules for your specific application.

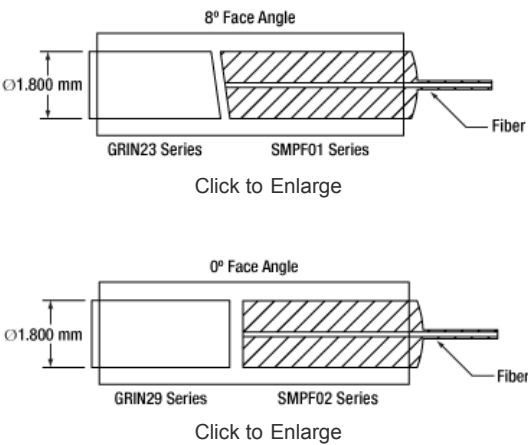
Our line of pigtailed glass ferrules is designed to simplify coupling of visible, near infrared, or infrared light between a fiber and a free-space optical system. They are commonly used in optical isolators, switches, and circulators. The Ø1.8 mm ferrule is significantly easier to handle than an unterminated fiber end. The 1 m long, single mode fiber embedded in the ferrule is protected by Ø900 µm white Hytrel furcation tubing and terminated with a narrow key FC/PC or FC/APC connector. See the *Specs* tab for the available fiber types and a representative schematic.

| Common Specifications |                       |
|-----------------------|-----------------------|
| Ferrule Diameter      | 1.800 mm ± 5 µm       |
| Ferrule Length        | 5.5 mm ± 0.5 mm       |
| Ferrule Material      | Borosilicate Glass    |
| Wedge Tolerance       | ±1.00°                |
| Fiber Length          | 1.0 m +0.075 m/-0.0 m |
| Protective Jacket     | Ø900 µm Hytrel Tubing |



These ferrules feature an AR coating centered at 633, 830, 1064, 1310, and 1550 nm or 1310/1550 nm. The coating lowers the reflectivity in the specified wavelength range to below 0.25%, reducing back reflections and insertion losses in the design wavelength range. In addition, all five coatings are available with either 8° or 0° face angles. The 8° versions maximize the return loss by back reflecting the incident light at a non-normal angle and are recommended for building collimators. In contrast, the 0° versions are easier to align but are only recommended for general fiber-to-fiber coupling. Our line of GRIN lenses provides an 8° or 0° face angle that is designed to match the pigtailed ferrules.

Thorlabs also offers a complete selection of mating sleeves that ensure proper alignment of the cores of a connectorized fiber end. If you do not see a pigtailed patch cable that meets your application requirements, please contact Tech Support and we will design a specialty cable to meet your needs.



All GRIN Lens / Pigtailed Ferrule combinations require a 51-2800-1800 mating sleeve, shown below. To build the device, insert the lens and ferrule into opposing sides of the sleeve, gently bring them into contact to ensure that the faces are parallel, then bring the lens and ferrule apart until the desired focusing is achieved.

| Selection Guide   |            |                        |                   |       |        |
|-------------------|------------|------------------------|-------------------|-------|--------|
| Wavelength        | Face Angle | Compatible GRIN Lenses | Pigtailed Ferrule |       |        |
| 633 ± 15 nm       | 8°         | GRIN2306A              | No Connector      | FC/PC | FC/APC |
|                   | 0°         | GRIN2906               | No Connector      | FC/PC | FC/APC |
| 830 ± 15 nm       | 8°         | GRIN2308A              | No Connector      | FC/PC | FC/APC |
|                   | 0°         | GRIN2908               | No Connector      | FC/PC | FC/APC |
| 1064 ± 15 nm      | 8°         | GRIN2310A              | No Connector      | FC/PC | FC/APC |
|                   | 0°         | GRIN2910               | No Connector      | FC/PC | FC/APC |
| 1310 ± 15 nm      | 8°         | GRIN2313A              | No Connector      | FC/PC | FC/APC |
|                   | 0°         | GRIN2913               | No Connector      | FC/PC | FC/APC |
| 1550 ± 15 nm      | 8°         | GRIN2315A              | No Connector      | FC/PC | -      |
|                   | 0°         | GRIN2915               | No Connector      | -     | FC/APC |
| 1310/1550 ± 40 nm | 8°         | GRIN2313A<br>GRIN2315A | -                 | -     | FC/APC |
|                   | 0°         | GRIN2913<br>GRIN2915   | -                 | FC/PC | -      |

Pigtailed Ferrules with FC/PC Connectors

| Item #      | Connector | Face Angle | AR Coating Range  | Reflectance Over AR Coating Range | NA   | Operating Wavelength | Cutoff Wavelength | Fiber Type    | Compatible GRIN Lens <sup>a</sup> | Reference Diagram                                                                   |
|-------------|-----------|------------|-------------------|-----------------------------------|------|----------------------|-------------------|---------------|-----------------------------------|-------------------------------------------------------------------------------------|
| SMPF0106-FC | FC/PC     | 8°         | 633 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 600 - 800 nm         | 500 - 600 nm      | SM600         | GRIN2306A                         |  |
| SMPF0108-FC |           |            | 830 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 800 - 1000 nm        | 660 - 800 nm      | SM800-5.6-125 | GRIN2308A                         |                                                                                     |
| SMPF0110-FC |           |            | 1064 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 980 - 1060 nm        | 920 ± 50 nm       | HI1060-J9     | GRIN2310A                         |                                                                                     |
| SMPF0113-FC |           |            | 1310 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 1260 - 1620 nm       | <1260 nm          | SMF-28e+      | GRIN2313A                         |                                                                                     |
| SMPF0115-FC |           |            | 1550 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 1260 - 1620 nm       | <1260 nm          | SMF-28e+      | GRIN2315A                         |                                                                                     |
| SMPF0206-FC |           | 0°         | 633 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 600 - 800 nm         | 500 - 600 nm      | SM600         | GRIN2906                          |  |
| SMPF0208-FC |           |            | 830 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 800 - 1000 nm        | 660 - 800 nm      | SM800-5.6-125 | GRIN2908                          |                                                                                     |
| SMPF0210-FC |           |            | 1064 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 980 - 1060 nm        | 920 ± 50 nm       | HI1060-J9     | GRIN2910                          |                                                                                     |
| SMPF0213-FC |           |            | 1310 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 1260 - 1620 nm       | <1260 nm          | SMF-28e+      | GRIN2913                          |                                                                                     |
| SMPF0215-FC |           |            | 1310/1550 ± 40 nm | R <sub>max</sub> < 0.25%          | 0.14 | 1260 - 1620 nm       | <1260 nm          | SMF-28e+      | GRIN2913<br>GRIN2915              |                                                                                     |

- GRIN lenses are sold separately.

| Part Number | Description                                                    | Price   | Availability |
|-------------|----------------------------------------------------------------|---------|--------------|
| SMPF0106-FC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/PC, AR Coated: 633 nm       | \$63.25 | Today        |
| SMPF0108-FC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/PC, AR Coated: 830 nm       | \$71.50 | Today        |
| SMPF0110-FC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/PC, AR Coated: 1064 nm      | \$71.50 | Today        |
| SMPF0113-FC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/PC, AR Coated: 1310 nm      | \$53.50 | 3-5 Days     |
| SMPF0115-FC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/PC, AR Coated: 1550 nm      | \$53.00 | Today        |
| SMPF0206-FC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/PC, AR Coated: 633 nm       | \$71.50 | Today        |
| SMPF0208-FC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/PC, AR Coated: 830 nm       | \$71.50 | Today        |
| SMPF0210-FC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/PC, AR Coated: 1064 nm      | \$66.00 | Today        |
| SMPF0213-FC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/PC, AR Coated: 1310 nm      | \$53.00 | 3-5 Days     |
| SMPF0215-FC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/PC, AR Coated: 1310/1550 nm | \$53.00 | Today        |

Pigtailed Ferrules with FC/APC Connectors

| Item #       | Connector | Face Angle | AR Coating Range  | Reflectance Over AR Coating Range | NA   | Operating Wavelength | Cutoff Wavelength | Fiber Type    | Compatible GRIN Lens <sup>a</sup> | Reference Diagram                                                                     |
|--------------|-----------|------------|-------------------|-----------------------------------|------|----------------------|-------------------|---------------|-----------------------------------|---------------------------------------------------------------------------------------|
| SMPF0106-APC | FC/APC    | 8°         | 633 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 600 - 800 nm         | 500 - 600 nm      | SM600         | GRIN2306A                         |  |
| SMPF0108-APC |           |            | 830 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 800 - 1000 nm        | 660 - 800 nm      | SM800-5.6-125 | GRIN2308A                         |                                                                                       |
| SMPF0110-APC |           |            | 1064 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 980 - 1060 nm        | 920 ± 50 nm       | HI1060-J9     | GRIN2310A                         |                                                                                       |
| SMPF0113-APC |           |            | 1310 ± 15 nm      | R <sub>avg</sub> < 0.25%          | 0.14 | 1260 - 1620 nm       | <1260 nm          | SMF-28e+      | GRIN2313A                         |                                                                                       |
| SMPF0115-APC |           |            | 1310/1550 ± 40 nm | R <sub>max</sub> < 0.25%          | 0.14 | 1260 - 1620 nm       | <1260 nm          | SMF-28e+      | GRIN2313A<br>GRIN2315A            |                                                                                       |
| SMPF0206-APC |           |            | 633 ± 15 nm       | R <sub>avg</sub> < 0.25%          | 0.12 | 600 - 800 nm         | 500 - 600 nm      | SM600         | GRIN2906                          |                                                                                       |
| SMPF0208-    |           |            |                   |                                   |      |                      | 660 - 800         | SM800-5.6-    |                                   |                                                                                       |

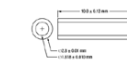
|              |    |              |                    |      |                |             |           |          |                                                                                     |
|--------------|----|--------------|--------------------|------|----------------|-------------|-----------|----------|-------------------------------------------------------------------------------------|
| APC          | 0° | 830 ± 15 nm  | $R_{avg} < 0.25\%$ | 0.12 | 800 - 1000 nm  | nm          | 125       | GRIN2908 |  |
| SMPF0210-APC |    | 1064 ± 15 nm | $R_{avg} < 0.25\%$ | 0.14 | 980 - 1060 nm  | 920 ± 50 nm | HI1060-J9 | GRIN2910 |                                                                                     |
| SMPF0213-APC |    | 1310 ± 15 nm | $R_{avg} < 0.25\%$ | 0.14 | 1260 - 1620 nm | <1260 nm    | SMF-28e+  | GRIN2913 |                                                                                     |
| SMPF0215-APC |    | 1550 ± 15 nm | $R_{avg} < 0.25\%$ | 0.14 | 1260 - 1620 nm | <1260 nm    | SMF-28e+  | GRIN2915 |                                                                                     |

- GRIN lenses are sold separately.

| Part Number  | Description                                                     | Price   | Availability |
|--------------|-----------------------------------------------------------------|---------|--------------|
| SMPF0106-APC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/APC, AR Coated: 633 nm       | \$73.50 | Today        |
| SMPF0108-APC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/APC, AR Coated: 830 nm       | \$81.50 | Today        |
| SMPF0110-APC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/APC, AR Coated: 1064 nm      | \$81.50 | Today        |
| SMPF0113-APC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/APC, AR Coated: 1310 nm      | \$63.50 | 3-5 Days     |
| SMPF0115-APC | Pigtailed Ferrule, Ø1.8 mm, 8°, FC/APC, AR Coated: 1310/1550 nm | \$63.25 | Today        |
| SMPF0206-APC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/APC, AR Coated: 633 nm       | \$81.50 | Today        |
| SMPF0208-APC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/APC, AR Coated: 830 nm       | \$81.50 | Today        |
| SMPF0210-APC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/APC, AR Coated: 1064 nm      | \$76.25 | Today        |
| SMPF0213-APC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/APC, AR Coated: 1310 nm      | \$63.25 | 3-5 Days     |
| SMPF0215-APC | Pigtailed Ferrule, Ø1.8 mm, 0°, FC/APC, AR Coated: 1550 nm      | \$63.25 | Today        |

## GRIN Lens / Ferrule Sleeves

- Borosilicate Glass
- 10.0 mm Length
- 1.818 mm Internal Diameter



[Click to Enlarge](#)

The 51-2800-1800 sleeve is designed to easily mate any one of our GRIN lenses to an SMPF pigtailed ferrule. The borosilicate glass is transparent to UV light, allowing curing of NOA68 or NOA61 optical adhesive inside the sleeve. See [here](#) for our complete selection of optical adhesives.

| Part Number  | Description                                                                       | Price  | Availability |
|--------------|-----------------------------------------------------------------------------------|--------|--------------|
| 51-2800-1800 | GRIN/Ferrule Sleeve, 1.818 mm Internal Diameter, 10 mm Length, Borosilicate Glass | \$6.05 | Today        |