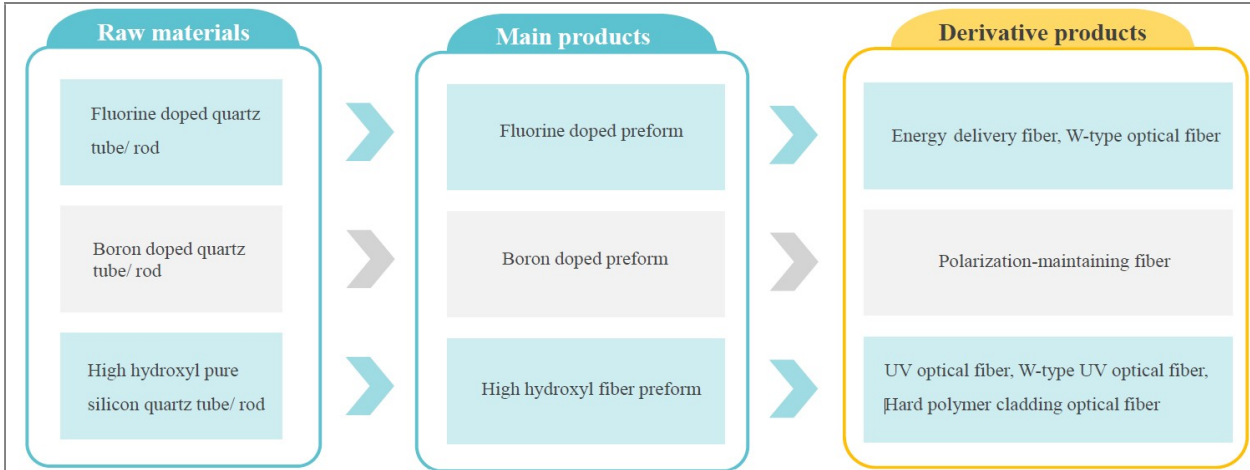


## SFL Series Quartz Tubes and Fiber Preforms

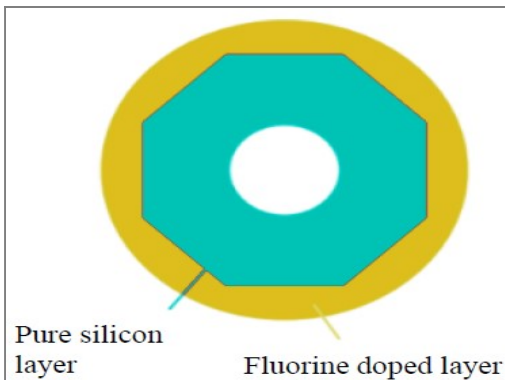
We provide key raw materials for optical fiber preforms, promoting the widespread applications of specialty optical fibers in the industrial field with high quality, reasonable price and custom-design & -fabrication.



### 1. Fluorine Doped Quartz Tube

Fluorine Doped Quartz Tube is mainly used for triple clad active fibers to protect the coating for the high-power pump light to the coating layer and improve the stability of laser systems.

- High fluorine doping concentration
- Precise geometric control
- Good temperature resistance performance



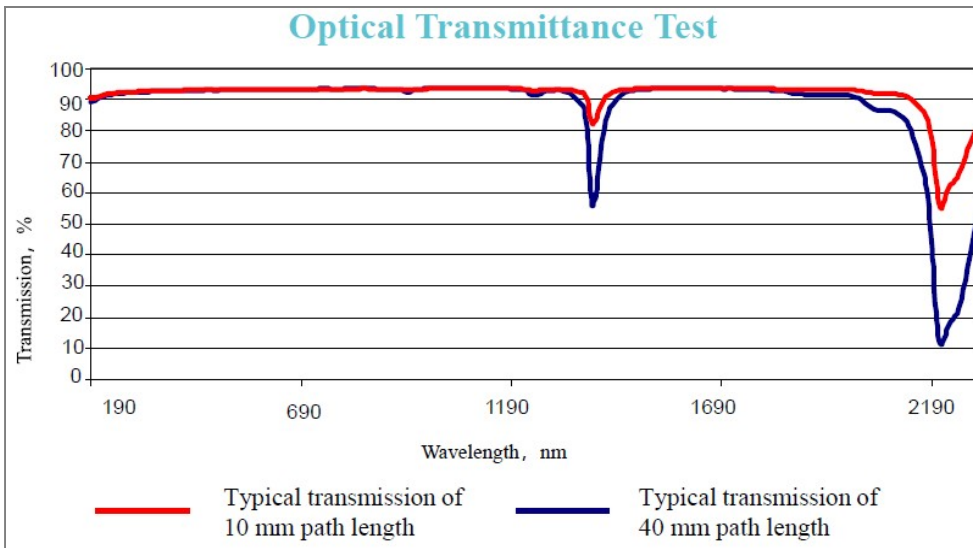
Technical Specifications:

Part number	SFL-FJT17.8/54.5/1000	SFL-FJT16/39.6/500
NA	0.22	0.22
Outside diameter (mm)	54.5±0.6	39.6±0.6
Inside diameter (mm)	17.8±0.5	16±0.5
Edge margin(mm)	47.8±0.4	34.4±0.4
Length (mm)	1000±50	500±50
Material	Fluorine-doped silicon dioxide	Fluorine-doped silicon dioxide
Core diameter (mm)	3.5	2.5

### 2. High OH Pure Silica Quartz Rod

High OH pure silica quartz rod is mainly used for ultraviolet fiber, pure silicon core high hydroxyl structure, low attenuation and excellent radiation resistance property in ultraviolet wavelength range.

- Excellent UV transmittance
- High refractive index homogeneity
- Excellent high temperature stability

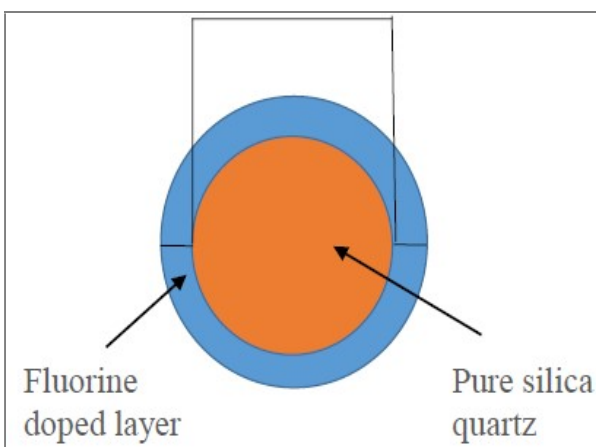


Part number	SFL-SQ1
Length (mm)	500-1000
Outside diameter (mm)	Customizable
OH content (ppm)	1200
Refractive indices $n_d$	1.45843
Strain point ( $^{\circ}\text{C}$ ) ( $\eta=10^{-14.5} \text{ dPa}\cdot\text{s}$ )	980
Annealing point ( $^{\circ}\text{C}$ ) ( $\eta=10^{-10.13} \text{ dPa}\cdot\text{s}$ )	1080
Softening point ( $^{\circ}\text{C}$ ) ( $\eta=10^{-7.6} \text{ dPa}\cdot\text{s}$ )	1600

### 3. Fluorine Doped Preforms

The step refractive index multimode preform is made from high-purity quartz as the core rod. Atmospheric pressure plasma external deposition process can satisfy the customization requirement of the customers.

- Deep fluorine doped cladding
- Waveguide can be designed
- Flexible NA and CCDR



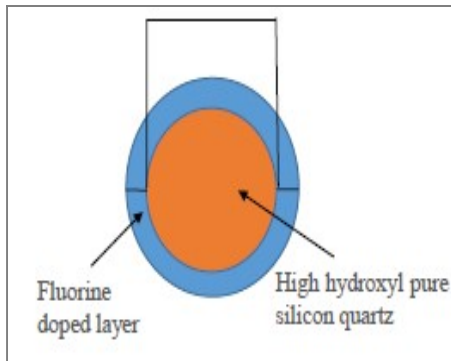
Part Number	SFL-8249	SFL-8239	SFL-8251
Index profile	Stepped	Stepped	Stepped
Inner cladding CCDR	1.1±0.015	1.19±0.015	1.15±0.015
Outer cladding CCDR	/	/	/

NA	0.22±0.02	0.22±0.02	0.22±0.02
Outside diameter (mm)	Customizable		
Length (mm)	500-1000	500-1000	500-1000
Preform non-circularity (%)	≤2.0	≤2.0	≤2.0
Core material	Pure silica quartz		
Cladding material	Fluorine doped quartz		

#### 4. UV Fluorine Doped Preforms

The step refractive index multimode preform is made from high hydroxyl pure quartz as the core rod. Atmospheric pressure plasma external deposition process can satisfy the customization requirement of the customers.

- Deep fluorine doped cladding
- Waveguide can be designed
- Flexible NA and CCDR

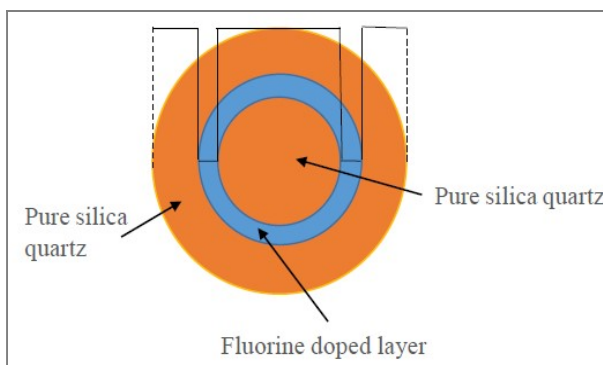


Part Number	SFL-8247	SFL-8238	SFL-8260
Index profile	Stepped	Stepped	Stepped
Inner cladding CCDR	1.1±0.015	1.19±0.015	2.5±0.015
Outer cladding CCDR	0.22±0.02	0.22±0.02	0.22±0.02
NA	49.5±0.5	38.0±1.0	60.0±0.5
Outside diameter(mm)	500~1000	500~1000	500~1000
Length(mm)	≤2.0	≤2.0	≤2.0
Preform non-circularity (%)	High hydroxyl pure silicon quartz		
Core material	Fluorine doped quartz		

#### 5. W-type Fluorine Doped Preforms

The step refractive index multimode W-type fluorine doped preform is made from high hydroxyl pure quartz as the core rod. Atmospheric pressure plasma external deposition process can satisfy the customization requirement of the customers.

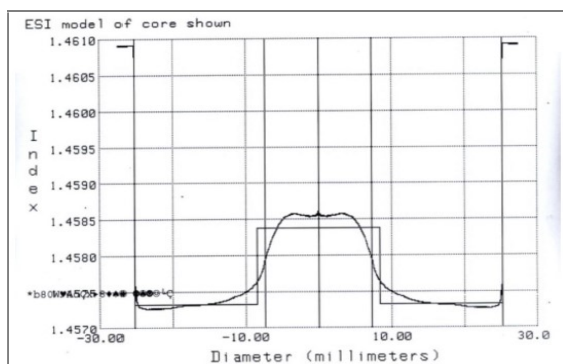
- Deep fluorine doped cladding
- Waveguide can be designed
- Flexible NA and CCDR



Part Number	SFL-8248	SFL-8242	SFL-8244	SFL-8250
Index profile	Stepped	Stepped	Stepped	Stepped
Inner cladding CCDR	1.1±0.015	1.13±0.015	1.2±0.015	1.4±0.015
NA	0.22±0.02	0.22±0.02	0.22±0.02	0.22±0.02
Outside diameter(mm)	49.5±0.5	42.0±0.5	44.5±0.5	50.0±1.0
Length(mm)	500~1000	500~1000	500~1000	500~1000
Preform non-circularity (%)	≤2.0	≤2.0	≤2.0	≤2.0
Core layer material	Pure silica quartz			
Inner cladding material	Fluorine doped quartz			
Outer cladding material	Pure silica quartz			

## 6. Germanium Fluorine Co-doped Preforms

Germanium fluorine co-doped preforms use the germanium doped quartz as the core rod, fluorine doped quartz as the cladding. Mainly used for producing passive waveguide single-mode optical fiber which is applied in industrial laser fields such as communication, industry, and medical treatment.



### Features

- Low NA single mode output
- Low splice loss
- High reliability of light matching

### Applications

- Continuous/Pulsed Laser
- Communication Industry
- Pigtail Output
- Fiber Combiner
- Fiber Grating

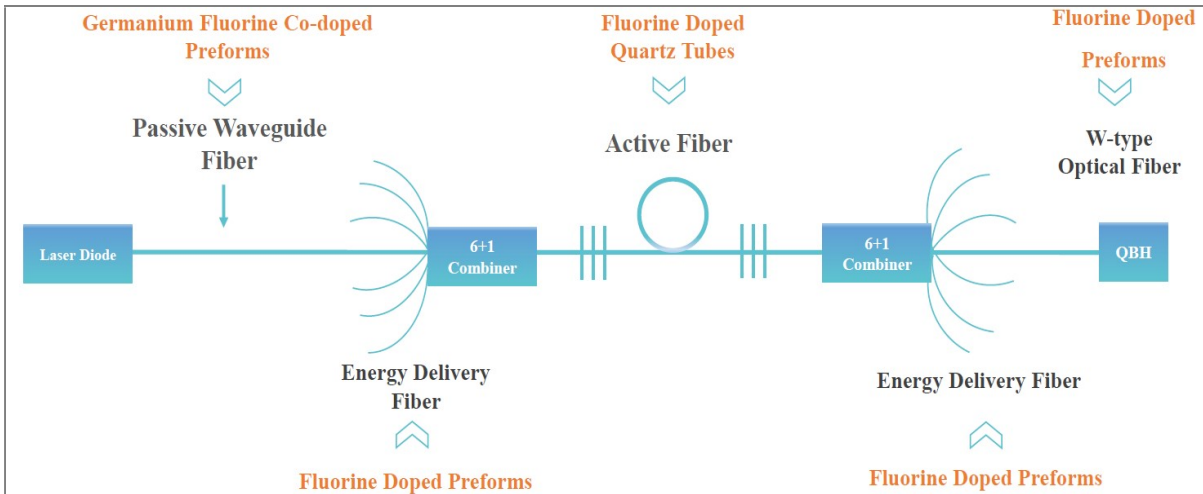
Part Number	SFL2118	SFL 2114	SFL 2117	SFL 2123	SFL 2119	SFL 2124	SFL 2112	SFL 2111
Refractive Index Profile	Stepped							
Cladding CCDR	11.8±1.0	17.03±0.5	6.5±0.5	12.35±1.0	19.75±1.0	9.88±0.5	9.88±0.5	9.88±0.5
NA	0.08±0.01	0.070±0.005	0.08±0.01	0.065±0.005	0.065±0.005	0.065±0.005	0.085±0.005	0.11±0.01
Outer Diameter (mm)	Customizable							
Length (mm)	500~1000							
Preform Non-circularity(%)	≤2.0							
Core Material	Germanium Doped Quartz							
Cladding Material	Fluorine Doped Quartz							

Part Number	SFL 2120	SFL 2113	SFL 2125	SFL 2116	SFL 2126	SFL 2121	SFL 2115	SFL 2122
Refractive Index Profile	Stepped							
Cladding CCDR	15.80±1.0	8.10±0.2	13.17±0.5	7.06±0.2	11.29±0.5	11.29±0.5	4.94±0.25	7.90±0.25
NA	0.065±0.005	0.065±0.005	0.075±0.005	0.11±0.01	0.075±0.005	0.11±0.005	0.11±0.01	0.11±0.01
Outer Diameter (mm)	Customizable							
Length (mm)	500~1000							
Preform Non-circularity (%)	≤2.0							
Core Material	Germanium Doped Quartz							
Cladding Material	Fluorine Doped Quartz							

Note: Product size and waveguide structure can be customized according to customer requirements.

## 7. Industry Applications and Solutions-Industrial Lasers

We provide key raw materials for fiber lasers and the wide applications of specialty optical fibers in the industrial fields with fiber preform and quartz tubes.



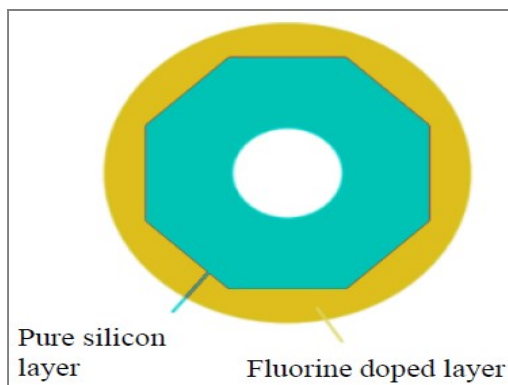
## Detailed Data Sheets of Fiber Preforms

### 1. Fluorine-doped Quartz Tube

The waveguide structure of Triple-cladding Active Optical Fibers (AOF), compared to Double-cladding Optical Fibers, can enable most of the pump light to reflect at the cladding, significantly improving the thermal management of the fiber, significantly reducing the reflection of high-power density pump light at the fragile organic coating layer, thereby greatly improving the stability and reliability of the entire laser optical path.

Fluorine-doped quartz tubes have the advantages of high fluorine concentration, low OH content, and good geometric uniformity. They can be made into multi-layer composite tubes with polygonal structures, and are widely used in triple-cladding Active Optical Fibers (AOF) and related Passive Optical Fibers (POF). Design fluorine doped quartz tubes with matching 2.5mm and 3.5mm core diameters for YDF 34/460/530 active doped optical fibers.

Fluorine-doped Tubes which used for Triple-cladding Active Optical Fibers (AOF) preforms can be customized.



#### Features

- High fluorine doping concentration
- Precise geometric control
- Good temperature resistance

#### Applications

- Triple-Cladding Fiber

#### Technical Specifications

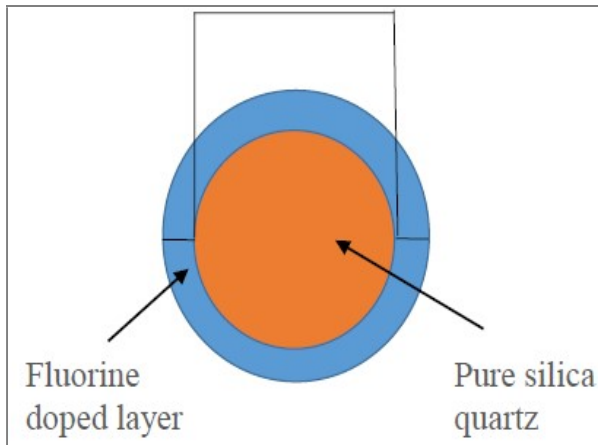
Part Number	SFL-FJT17.8/54.5/1000	FDJT16/39.6/500
Typical NA	0.22	0.22
Outer Diameter(mm)	54.5±1.0	39.6±1.0
Inside Diameter(mm)	17.8±1.0	16.0±1.0
Edge Margin(mm)	47.8±0.5	34.4±0.5
Length(mm)	1000±50	500±50
Octagon Tube Material	Fluorine Doped Quartz	Fluorine Doped Quartz
Core Diameter(mm)	3.5	2.5

Note: Fluorine-doped tube NA0.12 and NA0.15 can be customized.



## 2. Fluorine-doped Preform

The Fluorine-doped Preform is a refractive index stepped multi-mode preform made of high purity quartz as the core rod and using the Plasma Outside Deposition (POD) process under atmospheric pressure. We can adjust the shape of core and cladding to customer requirements.



### Features

- High fluorine doped cladding
- Waveguide can be designed
- Customizable NA and CCDR

### Applications

- Astronomical Observation
- Laser Transmission
- Laser Medical
- Specialty Optical Fiber Bundle
- IR Spectroscopy Applications
- Nuclear Power Radiation

### Technical Specifications

Part Number	SFL-8249	SFL-8239	SFL-8251
Wavelength (nm)	700~2200	700~2200	700~2200
OH Content (ppm)	< 1.0	< 1.0	< 1.0
Refractive Index Profile	Stepped	Stepped	Stepped
Inner Cladding CCDR	1.1±0.015	1.19±0.015	1.15±0.015
NA	0.22±0.02	0.22±0.02	0.22±0.02
Outer Diameter (mm)	49.5±0.5	44.0±0.5	42.5±0.5
Length (mm)	500~1000	500~1000	500~1000
Preform Non-circularity (%)	≤2.0	≤2.0	≤2.0
Core Layer Material	Pure Silica Quartz		
Cladding Material	Fluorine Doped Quartz		

Note: NA0.12 and NA0.14 can be customized. CCDR can be customized. Preform which OD is within 80mm can be customized.

## 3. UV Fluorine-doped Preform

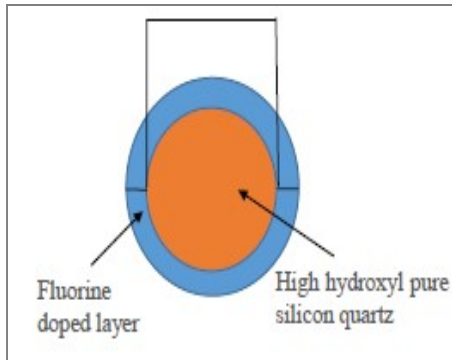
The UV Fluorine-doped Preform is a refractive index stepped multi-mode preform made of high OH purity quartz as the core rod and using the Plasma Outside Deposition (POD) process under atmospheric pressure. We can adjust the shape of core and cladding to customer requirements.

### Features

- High fluorine doped cladding
- Waveguide can be designed
- Customizable NA and CCDR

#### Applications

- Astronomical Observation
- Laser Transmission
- Laser Medical
- Specialty Optical Fiber Bundle
- Nuclear Power Radiation
- UV and Visible Spectroscopy Applications



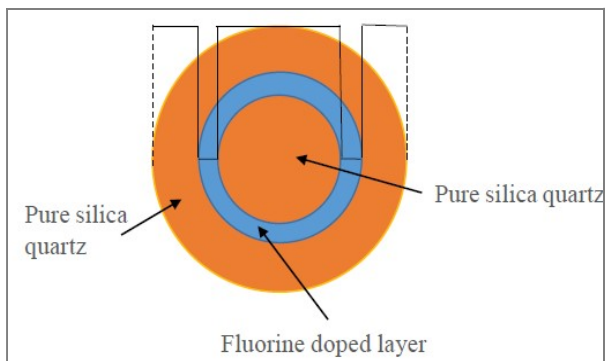
#### Technical Specifications

Part Number	SFL-8247	SFL-8238	SFL-8260
Wavelength (nm)	200~700	200~700	200~700
OH Content (ppm)	800~1000	800~1000	800~1000
Refractive Index Profile	Stepped	Stepped	Stepped
CCDR	1.1±0.015	1.19±0.015	2.5±0.015
NA	0.22±0.02	0.22±0.02	0.22±0.02
Outer Diameter (mm)	49.5±0.5	38.0±1.0	50.0±0.5
Length (mm)	500~1000	500~1000	500~1000
Preform Non-circularity (%)	≤2.0	≤2.0	≤2.0
Core Layer Material	High OH Pure Silicon Quartz		
Inner Cladding Material	Fluorine Doped Quartz		

Note: NA0.12 and NA0.14 can be customized. CCDR can be customized. Preform which OD is within 80mm can be customized

#### 4. W-Type Fluorine-doped Preform

The W-Type Fluorine-doped Preform is a refractive index stepped multi-mode preform made of high purity quartz as the core rod and using the Plasma Outside Deposition (POD) process under atmospheric pressure. We can adjust the shape of core and cladding to customer requirements.



#### Features

- High fluorine doped cladding
- Waveguide can be designed
- Customizable NA and CCDR

#### Applications

10 Bukit Batock Crescent #07-02 The Spire Singapore 658079 Tel: 6316 7112 Fax: 63167113  
<http://www.SintecOptronics.com> <http://www.sintec.sg> [sales@sintec.sg](mailto:sales@sintec.sg) [sales@SintecOptronics.com](mailto:sales@SintecOptronics.com)



- Astronomical Observation
- Laser Transmission
- Laser Medical
- Specialty Optical Fiber Bundle
- IR Spectroscopy Applications
- Nuclear Power Radiation

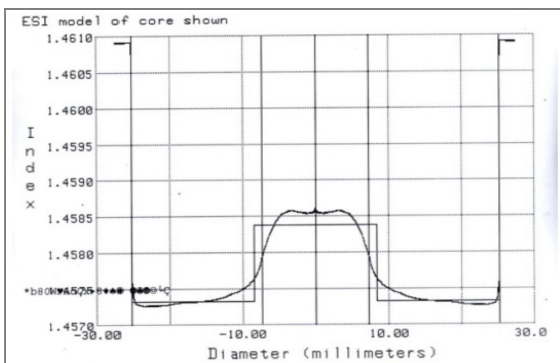
#### Technical Specifications

Part Number	SFL-8248	SFL-8242	SFL-8244	SFL-8250
Wavelength (nm)	700~2200	700~2200	700~2200	700~2200
OH Content (ppm)	< 1.0	< 1.0	< 1.0	< 1.0
Refractive Index Profile	Stepped			
Inner Cladding CCDR	1.1±0.015	1.13±0.015	1.2±0.015	1.4±0.015
Outer Cladding CCDR	1.8±0.015	2.4±0.015	3.6±0.015	7.2±0.015
NA	0.22±0.02	0.22±0.02	0.22±0.02	0.22±0.02
Outer Diameter (mm)	49.5±0.5	42.0±0.5	44.5±0.5	50.0±1.0
Length (mm)	500~1000	500~1000	500~1000	500~1000
Preform Non-circularity (%)	≤2.0	≤2.0	≤2.0	≤2.0
Core Layer Material	Pure Silica Quartz			
Inner Cladding Material	Fluorine Doped Quartz			
Outer Cladding Material	Pure Silica Quartz			

Note: NA0.12 and NA0.14 can be customized. CCDR can be customized. Preform which OD is within 80mm can be customized.

#### 5. Germanium Fluorine Co-doped Preform

Germanium fluorine co-doped preforms use the germanium doped quartz as the core rod, fluorine doped quartz as the cladding. Mainly used for producing passive waveguide single-mode optical fiber which is applied in industrial laser fields such as communication, industry, and medical treatment.



#### Features

- Low NA single mode output
- Low splice loss
- High reliability of light matching

#### Applications

- Continuous/Pulsed Laser
- Communication Industry
- Pigtail Output
- Fiber Combiner
- Fiber Grating

#### Technical Specifications:

Part Number	SFL2118	SFL 2114	SFL 2117	SFL 2123	SFL 2119	SFL 2124	SFL 2112	SFL 2111
Refractive Index Profile	Stepped							

Cladding CCDR	11.8±1.0	17.03±0.5	6.5±0.5	12.35±1.0	19.75±1.0	9.88±0.5	9.88±0.5	9.88±0.5
NA	0.08±0.01	0.070±0.005	0.08±0.01	0.065±0.005	0.065±0.005	0.065±0.005	0.085±0.005	0.11±0.01
Outer Diameter (mm)	Customizable							
Length (mm)	500~1000							
Preform Non-circularity(%)	≤2.0							
Core Material	Germanium Doped Quartz							
Cladding Material	Fluorine Doped Quartz							

Part Number	SFL 2120	SFL 2113	SFL 2125	SFL 2116	SFL 2126	SFL 2121	SFL 2115	SFL 2122
Refractive Index Profile	Stepped							
Cladding CCDR	15.80±1.0	8.10±0.2	13.17±0.5	7.06±0.2	11.29±0.5	11.29±0.5	4.94±0.25	7.90±0.25
NA	0.065±0.005	0.065±0.005	0.075±0.005	0.11±0.01	0.075±0.005	0.11±0.005	0.11±0.01	0.11±0.01
Outer Diameter (mm)	Customizable							
Length (mm)	500~1000							
Preform Non-circularity (%)	≤2.0							
Core Material	Germanium Doped Quartz							
Cladding Material	Fluorine Doped Quartz							

Note: Product size and waveguide structure can be customized according to customer requirements.