

## j-FST – Fluorine Doped Silica Tubes

With j-FST Fluorine Doped Silica Tubes j-plasma offers the perfect material for individual preform designs and innovative specialty fiber making.

j-FST tubes feature highest fluorine concentrations of 4 weight % resulting in a negative refraction index delta of  $(17 \pm 3) \times 10^{-3}$ . Their Numerical Aperture (NA) of up to 0.22, relative to pure silica, gives specialty fiber manufacturers a reliable source for high performance fluorine doped tubes.

We offer j-FST Fluorine Doped Silica Tubes as uniformly fluorine doped tubes or in customized versions.

### Characteristics (uniformly doped tubes)

	Spec. Values	Unit
Material composition	SiO <sub>2</sub> /F	
Fluorine content	up to 4	wt %
Refractive index delta (negative related to undoped silica)	up to $(17 \pm 3) \times 10^{-3}$	
Refractive index <sup>1</sup> @ 633 nm	1.440	
Refractive index <sup>1</sup> @ 1064 nm	1.433	
Thermal expansion coefficient (20° - 400° C)	$2.5 \times 10^{-7} \text{K}^{-1}$	
Density <sup>1</sup>	2.180	g/cm <sup>3</sup>
Tube inner diameter (I.D.)	20 - 40	mm
Fluorine doped wall thickness (W.S.)	1.5 - 15	mm
Tube length	up to 1000	mm
Ovality	≤ 3	%
Bow	≤ 1.5	mm/m

<sup>1</sup> Refers to fluorine content of 4 wt %

### Applications

Developed for manufacturing of special fiber designs as substrate or jacketing tube

- Overcladding processes in preform manufacturing
- As substrate materials in CVD processes
- As fluorine doped capillaries used for specialty fiber designs

### Features

- Uniformly high fluorine concentration
- Easy to post-treat and process into preforms or capillaries
- Available with low OH content (less than 20ppm)

### Customized tube designs

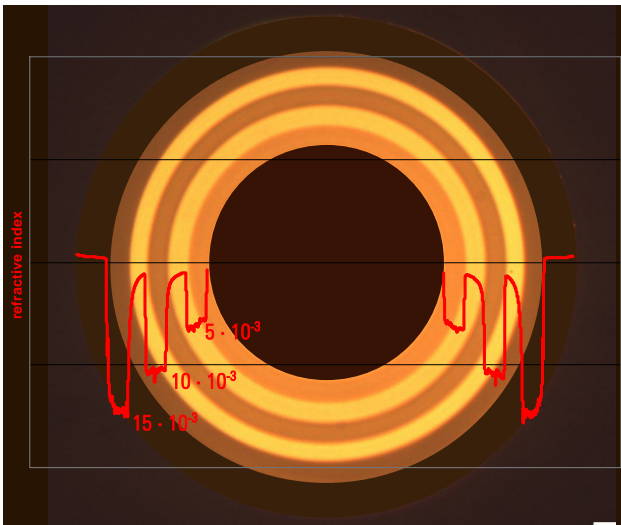
Customized j-FST tube designs can be individually specified with double or multi step refraction index profiles to define the ideal material that precisely meets preform parameters or specialty fiber specifications. Options are:

- Customized wall size dimensions
- Doped and undoped layers in accordance with customer requirements
- Customer-specific fluorine doping concentration
- Inside and outside layers with pure silica

For further information about our j-FST – Fluorine Doped Silica Tubes and other j-plasma products and services, please contact us:

**j-plasma GmbH**  
 Im Semmicht 1  
 D-07751 Jena, Germany  
 Tel.: +49-3641-352 100  
 Fax: +49-3641-352 101  
 Email: [info@j-plasma.com](mailto:info@j-plasma.com)  
 Internet: [www.j-fiber.com](http://www.j-fiber.com)

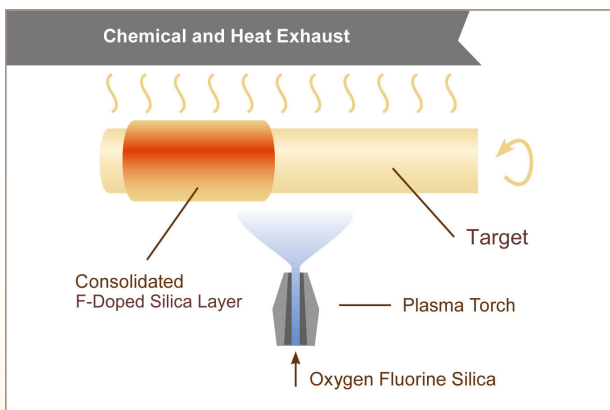
## Example of customized tube design



1<sup>st</sup> layer doped – 2<sup>nd</sup> layer undoped – 3<sup>rd</sup> layer doped –  
4<sup>th</sup> layer undoped – 5<sup>th</sup> layer doped

## Process Method

The j-FST tubes are manufactured by j-fiber's Plasma Based Deposition (PBD) process. A plasma torch is thereby used as a heating source for the chemical reaction of  $\text{SiCl}_4$ ,  $\text{O}_2$  and a fluorine containing gas. The high temperature plasma leads to chemical deposition conditions that support a high fluorine concentration in the deposited silica layers.



## Ordering Information

To order j-plasma tube products please call, fax or email us and specify the following parameters:

Type:	j-FST - Fluorine Doped Silica Tubes
Wall thickness:	WS 1.5 – 15 mm
Inner diameter	mm
Custom request	Refractive Index Profile
Length:	Up to 1000 mm
Quantity:	m

For customized j-FST please contact us to define your specific requirements.

All j-plasma products are subject to j-plasma's ongoing process and quality improvement programs ensuring excellent performance and high reliability. We reserve the right to make changes to the above specifications without notice.

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DB-PXT-001-02-0112 Issued January 2012  
Supersedes DB-PXT-001-01-1011

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