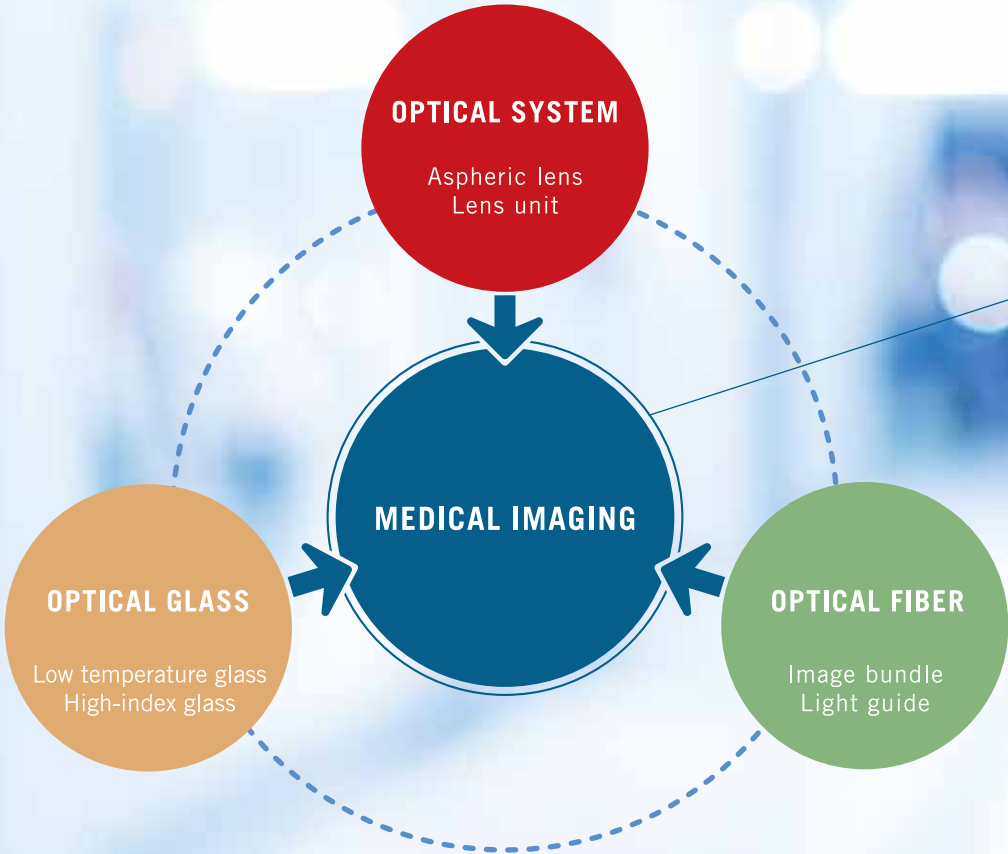




## Medical Imaging

Long experience and the cutting edge technologies for minimally invasive treatments.

SUMITA has created a wide variety optical components since the foundation in 1953, from melting optical glass materials to optical fibers and molded aspheric lenses made with high precision dies. Most advanced products are essential for a lot of industries, such as telecommunication, semiconductor, image processing and medical. We develop customers' trust to meet individual needs with unique products.



Advantages

- 01 Almost all Key Parts Produced in-House
- 02 Advanced Fine Processing Technologies
- 03 Optical Technologies accumulated over many years

We will continue to meet our customers' needs - from parts to semi-assembled product - by utilizing our existing technologies and products. We will continue to propose advanced medical devices that will support the development of new endoscopes for minimally invasive treatments.

/ Our factory is Licensed for Medical



## LENS

We can support optical design.

**P.08 - 10  
Sumita  
Endoscope Lens**



**P.11  
Small Lens unit**



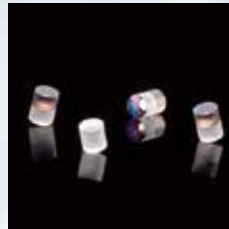
**P.12  
FOCUSROD**



**P.13  
Aspherical Lens**



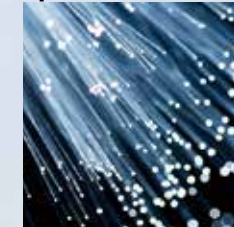
**P.13  
Ultra Micro Lens**



## LIGHT GUIDE

We manufacture light guides upon customers demand, 100% custom made.

**P.14  
Optical Fiber**



**P.16  
Light Guide**



**P.17  
Conduit**



*Advanced endoscopes by innovations and long experience.*

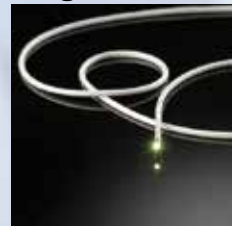
## IMAGING

Providing high resolution and thin image bundles.

**P.06  
HDIG**



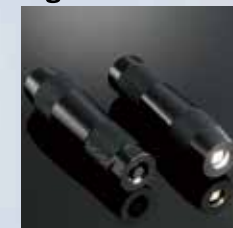
**P.07  
Image Bundle**



## LIGHT SOURCE

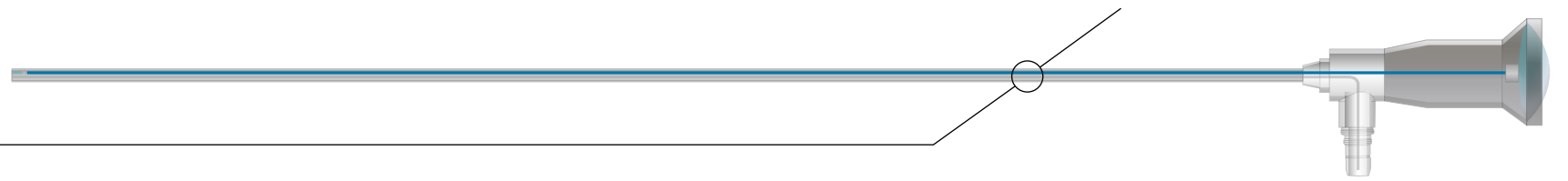
We tailor products to meet your various needs from optical fibers to LED illuminations.

**P.20  
Light Source**





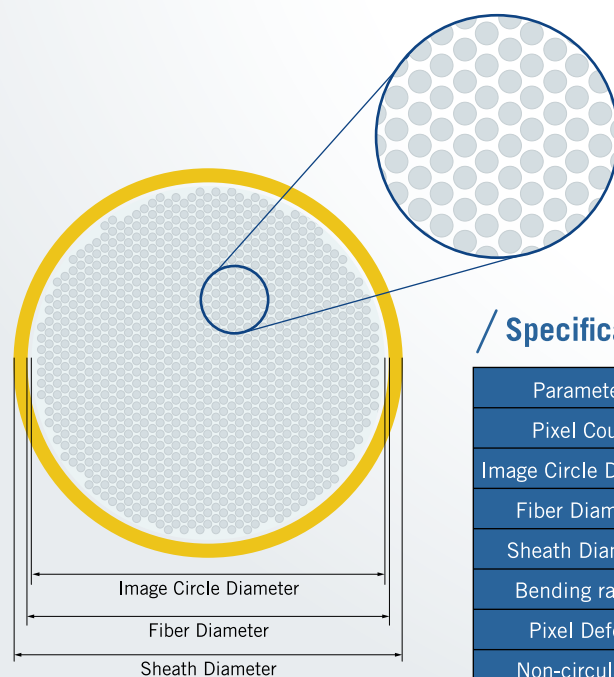
# Imaging



## HDIG - Semi Flexible

### Ultrafine image bundle for minimally invasive treatments

Although it is ultra fine diameter, the HDIG has 10,000 pixels. It gives customers a chance to produce thin endoscope with a diameter of less than 1.0 mm.



### / Specifications

Parameters	Standard value	Tolerance
Pixel Count	10,000	±10%
Image Circle Diameter	327μm	±15μm
Fiber Diameter	350μm	±15μm
Sheath Diameter	385μm	±15μm
Bending radius	R20	-
Pixel Defect	<0.1%	-
Non-circularity	<5%	-
Coating	Polyimide	

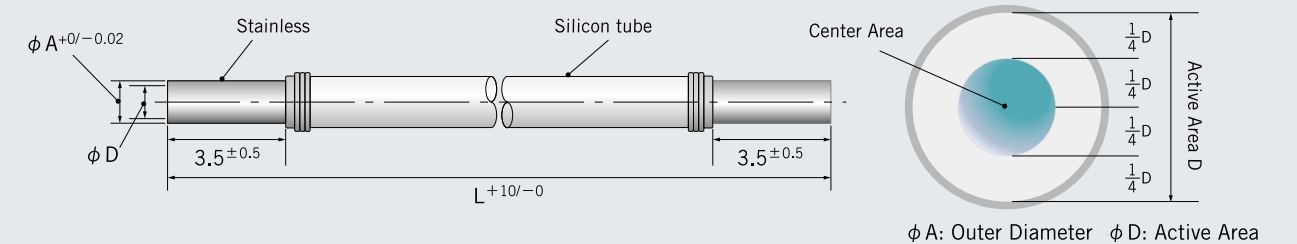
## Image bundle - flexible



Image bundles are produced 100% custom made, so please feel free to contact us with your needed specifications.



9,000 pix



### / Specifications

Outer Diameter	Pixel Count	Active Diameter	Single Fiber Diameter ±0.3	Pixel Count in Active Diameter	Maximum Number of Defects <sup>*1,*2</sup>	
					Total <sup>*3</sup>	Broken
0/-0.02	+20%,-0					
0.7mm	3,600	0.4mm	7.8μm	2,380	3(0)	1(0)
0.7mm	5,200	0.4mm	6.4μm	3,500	4(0)	1(0)
0.82mm	7,000	0.5mm	7.0μm	4,600	3(0)	1(0)
1.0mm	7,000	0.65mm	8.3μm	5,500	3(0)	1(0)
1.2mm	10,000	0.8mm	8.3μm	8,400	3(0)	1(0)

\*1 No Adjacent Broken Fiber \*2 Bracket shows the maximum number of defects in the center area \*3 Half Tones and Broken Fibers

• Please feel free to contact us about specifications and customized products.

# Endoscope Lens



We offer mounting our lens-unit to your sensors.

Please feel free to contact us.

1/6 SEL140-032

1/6 SEL120-034

1/10 SEL150-038

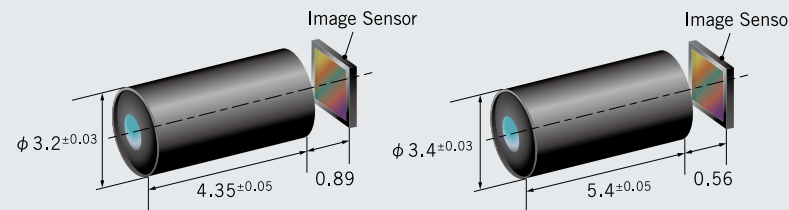
1/10 SEL120-022

1/10 SEL100-020

## Sumita Endoscope Lens

### Objective lens units for 1/6 and 1/10 CCD and CMOS image sensors.

We offer the Sumita endoscope lenses with a high brightness and a long depth of field because every lens is aspheric.



#### / 1/6 Series

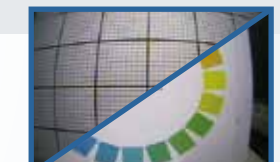
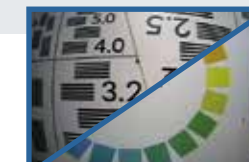
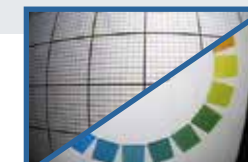
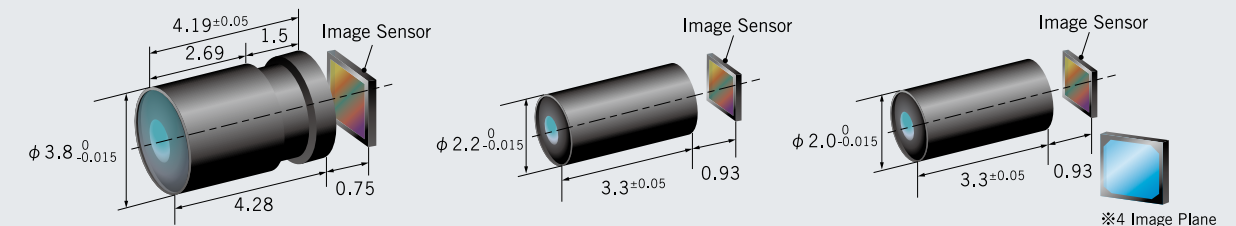
Parameter	1/6 SEL140-032	1/6 SEL120-034
CCD Size	1/6inch	
Image Circle	3.0mm	
Cover Glass	0.3mm	0.5mm

Object Distance (Design Value)	8mm	10mm
Depth of Field	3mm~∞	5mm~100mm
Diagonal Angle of View	140°	120°
F Number*1	3.5 to 8	3.5 to 10
Back Focus in Air	0.89mm	0.56mm
TV Distortion	<45%	<50%
Relative illumination	>20%	>40%
Cheif Ray Angle	<16°	<1°

Outer Diameter	φ 3.2mm	φ 3.4mm
Total Length	4.35mm	5.4mm
Mount	-	-

IR Cut Filter	○	○
Sapphire Cover Glass	○	-

\*1 F number is changeable



#### / 1/10 Series

Parameter	1/10 SEL150-038*2	1/10 SEL120-022	1/10 SEL100-020
CCD Size	1/10inch		
Image Circle	1.8mm		1.8mm*4
Cover Glass	0.5mm		

Object Distance (Design Value)	20mm	10mm	
Depth of Field	5mm~∞	5mm~100mm	
Diagonal Angle of View	150°	120°	100°
F Number*1	5.8	3.5 to 10	
Back Focus in Air	0.75mm	0.93mm	
TV Distortion	<60%	<35%	<25%
Relative illumination	>40%	>20%	>25%
Cheif Ray Angle	<1°	<10°	

Outer Diameter	φ 3.8mm	φ 2.2mm	φ 2mm
Total Length	4.28mm	3.2mm	
Mount	M3.5x0.35	-	

IR Cut Filter	-	○	
Sapphire Cover Glass	-	-	

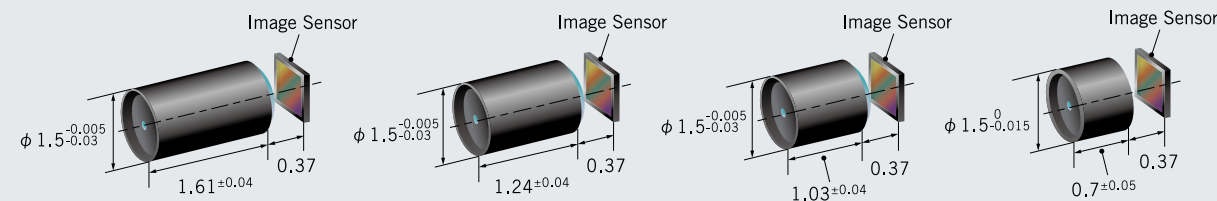
\*1 F number is changeable \*2 Built to Order

# Endoscope Lens



## Sumita Endoscope Lens

Objective lens units for 1/18 CMOS image sensors.



### 1/18 Series

Parameter	1/18 SEL080-015D	1/18 SEL100-015D	1/18 SEL120-015D	1/18 SEL100-015S
Sensor Size	1/18inch			
Image Circle	1.0mm			

Object Distance*	8mm			
Depth of Field	3mm~100mm			
Diagonal Angle of View	80°	100°	120°	100°
F Number	4.5/5/5.5/6			
Back Focus in Air	0.37mm			
Distortion*	<20%	<32%	<46%	<24%
Relative Illumination*	>80%	>70%	>60%	>50%
CRA*	<25°			

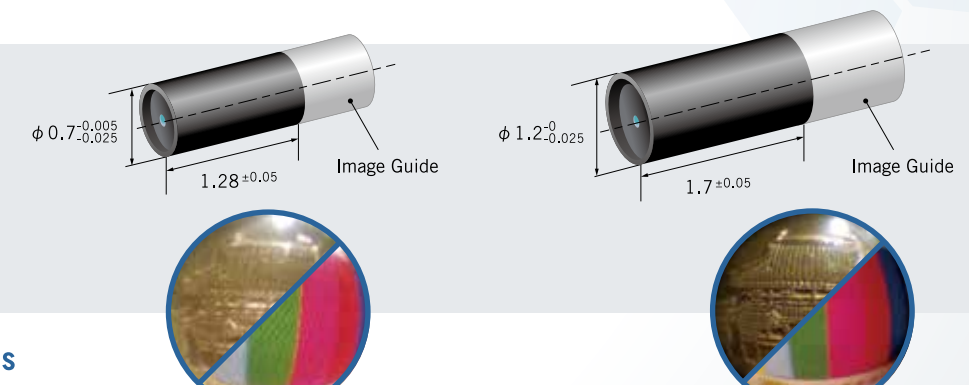
Outer Diameter	φ 1.5mm			
Length	1.61mm	1.24mm	1.03mm	0.7mm

\* Design Value

## Sumita Image Guide Lens

The small lens units are suitable for small image bundles

The Sumita Image Guide Lens has a wide angle of view 110 degrees. We also offer image bundles with lens units already assembled to it.



### Specifications

Lens	Parameter	IB SEL110-007	IB SEL110-012
	Image Circle	φ 0.55mm	φ 0.9mm
	Angle of view	110°	110°
	Focal Depth	2mm~40mm	2mm~40mm
	F Number	3	3.5
	Distortion*	37.5%	36%
	Outer Diameter	φ 0.7mm	φ 1.2mm
	Length	1.28mm	1.7mm
	Material	SUS	SUS

IG	Model Number	07F0910C-7.2ESA	07F1000PUC-5.5ESA	118F0790A-7.4ESA	126F0840C-6.7ESA	126F0910C-7.4ESA
	Active Area	φ 0.4mm	φ 0.5mm	φ 0.89mm	φ 0.8mm	φ 0.89mm
	Pixel Count	5,200	9,000	16,000	16,000	16,000
	Ferrule Diameter	φ 0.7mm	φ 0.7mm	φ 1.18mm	φ 1.2mm	φ 1.26mm

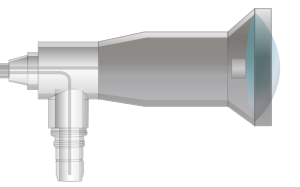
\* Design Value

SUMITA Optical Glass Inc., Medical Imaging Catalog-Endoscope Lens-

SUMITA Optical Glass Inc., Medical Imaging Catalog-Endoscope Lens-



# Endoscope Lens



## Aspherical Lens

Aspheric lenses by precision molding are used in digital still cameras, surveillance cameras and optical communication.

We are able to supply aspheric lenses from 1mm to over 50mm in diameter and to mold very precise lens at Ra0.003μm.

## FOCUSROD®



**Gradient index lenses with outer diameter from 0.15 to 0.8 mm.**

Its features are wide angle of view and less color aberration.

Since the end face is flat, it is easier to mount on an endoscope as an objective lens.

### Customization available

Outer Diameter:  $\phi$  0.15~0.80mm  
Focal Length: 0.04~50mm  
Angle of View: 65~80°

### Specifications

Diameter	$\phi$ 1mm - $\phi$ 50mm
Center Thickness	0.5mm - 20mm
Shapes	Bi-convex Double-concave Meniscus
Radius curvature	0.6mm - $\infty$
Coatings	AR coating Others upon request

• Lens custom made to your specification

### Accuracy

Parameter	Standard Value	Actual Value
Diameter	$\pm$ 0.02mm	$\pm$ 0.005mm
Center Thickness	$\pm$ 0.03mm	$\pm$ 0.005mm
Deviation and Irregularity*	3(1)	1(0.5)
PV Error	P-V= $\leq$ 1μm	P-V= $\leq$ 0.5μm
Decentricity	1'	0.2'
Surface Roughness	Ra 0.005μm	Ra 0.003μm

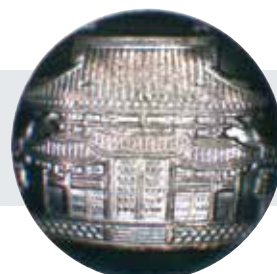
• Accuracy depends on size and form of lens.

\* According to ISO10110

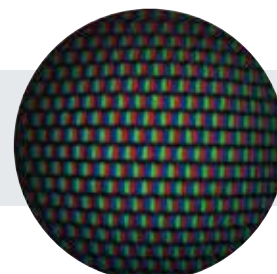
### / FR-80



Numbers



Coin



Liquid crystal panel

### Specifications

Types	FR-80	FR-70	FR-65
Outer Diameter	0.350mm+0/-0.005	0.350mm+0/-0.010	0.350mm+0/-0.010
Lens Length	0.732mm $\pm$ 0.050	0.762mm $\pm$ 0.050	0.780mm $\pm$ 0.050
Resolution	More than 400LP/mm at center than 150LP/mm at periphery		
Magnification	1:23	1:20	1:18
Angle of View	80 $\pm$ 2°	70 $\pm$ 2°	65 $\pm$ 2°
Working Distance	5.0mm		
Field Curvature	< 40μm	< 30μm	< 25μm
Chromatic Aberration	< 15μm		
Refractive Index at Center	about 1.674	about 1.665	about 1.660
Convergence Parameter	about 2.21	about 2.11	about 2.08

• FOCUSROD® and focus rod are registered trademarks of Sumita Optical Glass, Inc.

SUMITA Optical Glass Inc., Medical Imaging Catalog-Endoscope Lens-



## Ultra Micro Lens

**The molded Aspheric lens is 0.35 mm in diameter.**

The ultra micro lens made of high index glass enables endoscopes to take wide pictures.

### Specifications

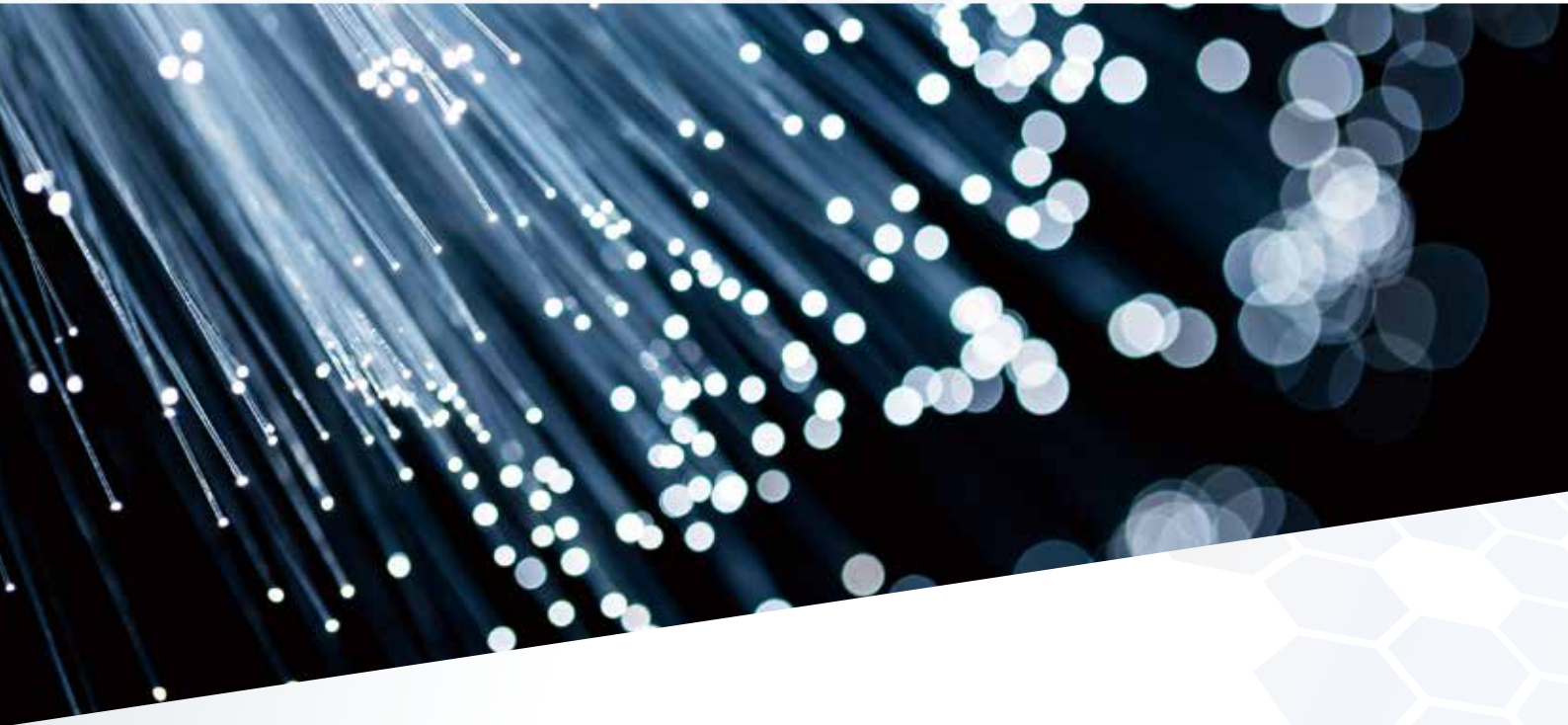
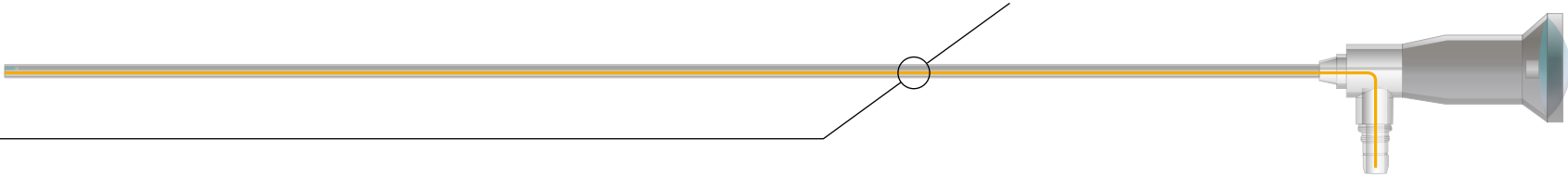
Diameter	$\phi$ 0.35mm -
Center Thickness	0.2mm - 5mm
Shapes	Plano, Bi-convex, Bi-concave, meniscus
Radius	0.4mm - of curvature
Coatings	AR coating Others upon request
Others	Lens with cover glass is available as far as a plano-convex.

### Accuracy

Parameter	Standard Value	Actual Value
Diameter	$\pm$ 0.01mm	$\pm$ 0.003mm
Center Thickness	$\pm$ 0.02mm	$\pm$ 0.005mm
Deviation and Irregularity	5(3)	3(1)

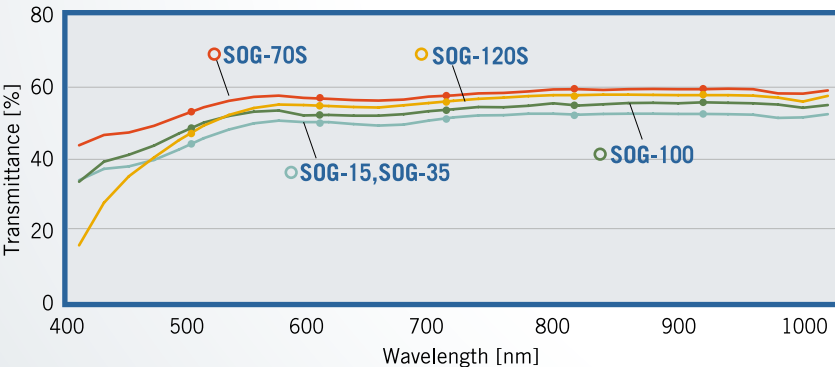
SUMITA Optical Glass Inc., Medical Imaging Catalog-Endoscope Lens-

# Light Guide



## Glass Optical Fiber

With 50 years of experience, we offer high quality fiber optics.  
Our fiber optics are RoHS and REACH compliant.



### Measurement Condition

Length: 2M  
Single Fiber Diameter: 50  $\mu$ m  
Core Occupancy Ratio: approx. 70%

### Fiber types

Wavelength	Fiber type	NA	Opening Angle	Feature
Visible	SOG-15	0.13	15°	Each raw glass optical fibers have a wide variety of aperture angles from 15 degrees to 120 degrees to meet your needs.
	SOG-35	0.29	35°	
	SOG-70S	0.57	70°	
	SOG-80	0.63	80°	
	SOG-100	0.77	100°	
	SOG-120S	0.87	120°	
Infrared	SOG-70SIR	0.57	70°	SOG-70IRA has better transmittance between 1100nm and 1350nm Compared with SOG-70S.

## Delivery Forms

We don't only develop the raw glass materials for fibers in house, we also draw all of our fibers internally .  
We control every stage of production process in fibers "highest" quality, controlling the actual number of fibers by counting them. Fibers are offered in three different forms, based on customers needs.

Raw Fiber in Nylon Mesh Tube	Raw Fiber on Spool	CD-Cord
		
- Small Quantity - Short Length - Large Diameter	- Low Cost - Small Diameter	- Large Diameter Compared with Bulk Fiber Bundles on Spool

### Custom Sized Bundles

#### Raw Fiber in Nylon Mesh Tube

Type of Fibers	Availability		The Number of Fibers	The Minimum Length of Fiber	
	30 $\mu$ m	50 $\mu$ m		Minimum	Maximum
SOG-15	○	○	100~40,000	As requested	Up to 12m
SOG-35					
SOG-70S					
SOG-80S					
SOG-100					
SOG-120S					

#### Raw Fiber on Spool

Type of Fibers	30 $\mu$ m	50 $\mu$ m	The Number of Fibers	Length of Fiber (m)
SOG-70S	X	○	100	3,000
	X		200	2,000

\* Max length on spool depend on the number of fibers

#### CD-Cord

Type of Fibers	30μm	50μm	The Number of Fibers		The Minimum Length of Fiber (m)
SOG-15	X	○	100~	1,200	100
SOG-35					
SOG-70S	○			10,000	
SOG-80S	X			1,200	
SOG-100				5,000	
SOG-120S	○				

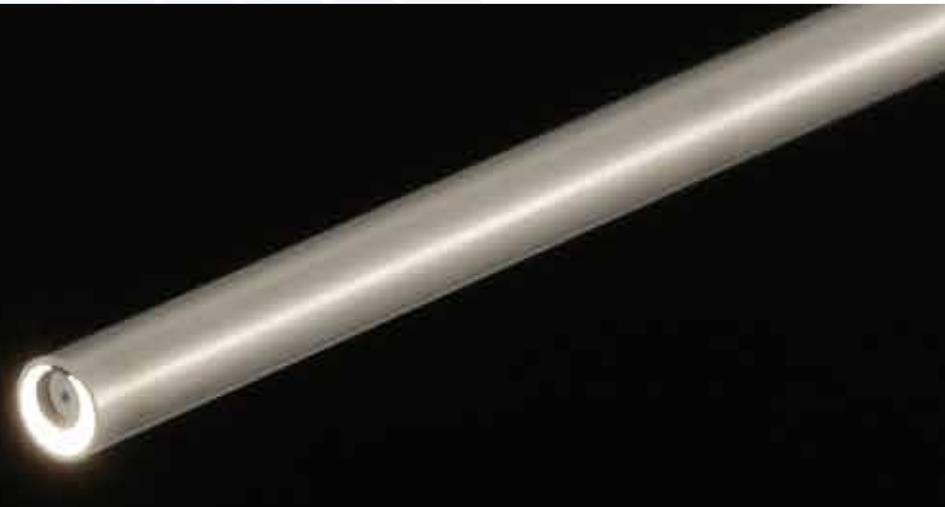
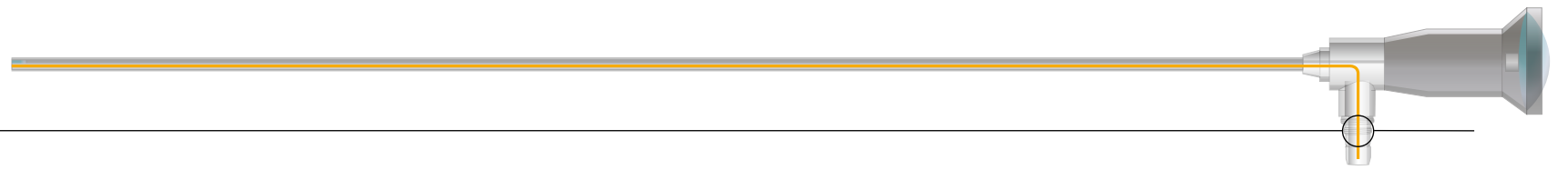
### Conversion Table: Outer Diameters and The Number of Fibers

The Number of Fibers		20	25	100	200	1,200	5,000	10,000
Bundled Fiber Diameter (mm)	30 $\mu$ m	0.14	0.15	0.32	0.45	1.10	2.20	3.10
	50 $\mu$ m	0.23	0.26	0.53	0.74	0.82	3.70	5.30

\* Bundled Fiber Diameters are approximate value.



# Light Guide



## Light Guide for Medical Devices

We offer a wide variety of light guides for medical devices, such as ultra thin light guides and/or multiple branch light guides. Our light guides are high precision, made in Japan and also to be customized to your request.



Square



Crescent



Ring

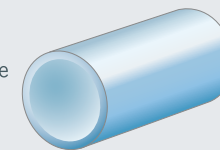
## Light Rod Conduit

### Rigid Fiber Rods have excellent light transmission

Light Rod Conduits are rigid fiber rods which consist of core and cladding. Cores and claddings are fused together without adhesive. Light Rod Conduits have higher transmittance than epoxied light guides and have a higher resistance to high temperature.

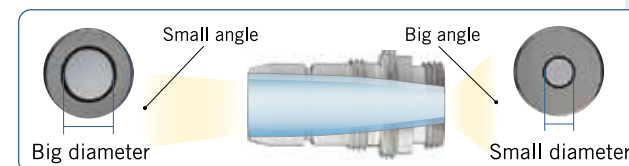
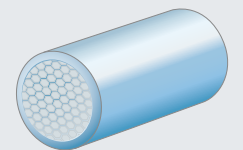
#### Single Rod

Single rods consist of a core and a cladding.



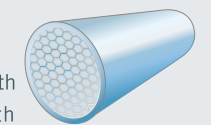
#### Conduit

Conduits consist of a lot of cores and claddings fused together.



#### Tapered Conduit

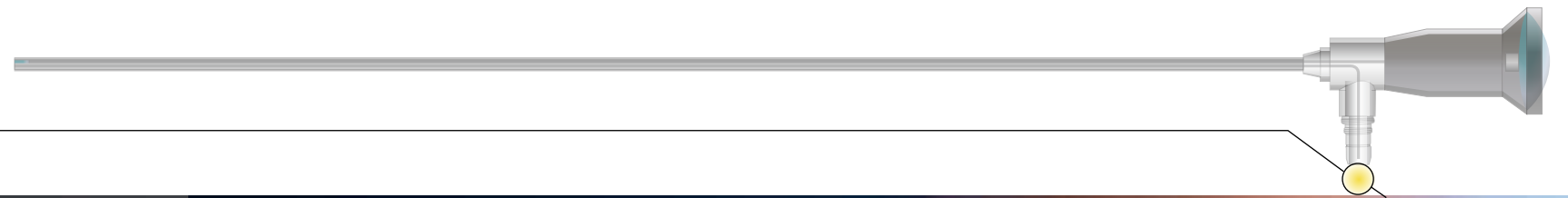
Tapered conduits are conduits with different outer diameter at both ends. Light intensity per area increases at small side.



### Specifications

	Tapered Conduit	Single Rod	Conduit
NA	0.57		
The Number of Fiber	1,900~1,950	1	1,900~1,950
Diameter	φ 1.5~13mm	φ 1~10mm	φ 2~13mm
Length	10mm~	2~1000mm	2~300mm

# Light Source



Light Source for Medical Device



## Aladuck LS-DLED

The LED light source, Aladuck LS-DLED, emits ultraviolet rays and white light.

Portable LED illumination

• Our light sources are neither CE nor UL licensed.

SUMITA Optical Glass Inc., Medical Imaging Catalog - Light Source-







Create the future  
[www.sumita-opt.co.jp](http://www.sumita-opt.co.jp)

**SUMITA**  
new glass & fiber optics

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