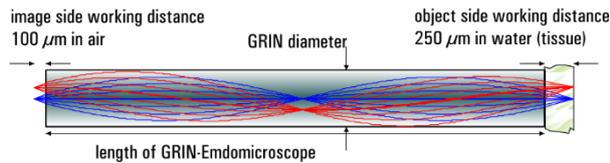


## GRIN Needle Endoscopes for 2-Photon Microscopy

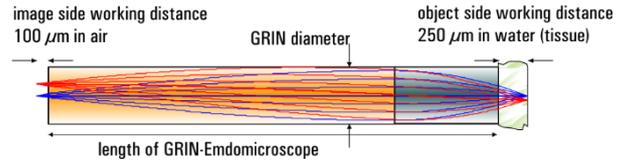
GRIN Needle Endoscopes are used for deep tissue imaging. They relay the micron-scale resolved image of the tissue over a longer length to a plane outside of the tissue at the other end of the needlescope. They are used with multi-photon fluorescence imaging (Design Wavelength 860 nm). The Endoscopes are fabricated as GRIN-singlets with NA = 0.50 on both sides or as GRIN-doublets with an object NA of 0.5 and an image NA of 0.19. Working distances on object side are specified in water or tissue, on image side in air. They are offered in different lengths resulting from adding 0.5 GRIN-pitches (periods) to the GRIN. Optional, they can be offered as side viewing needlescope by adding a 90° prism on object side.

### Singlets:



- object side working distance in water: 250  $\mu\text{m}$
- image side working distance in air: 100  $\mu\text{m}$
- design wavelength: 860 nm
- NA object / image side: 0.50 / 0.50
- Magnification: 1:1 / 1:-1 (depending on pitch length)

### Doublets:

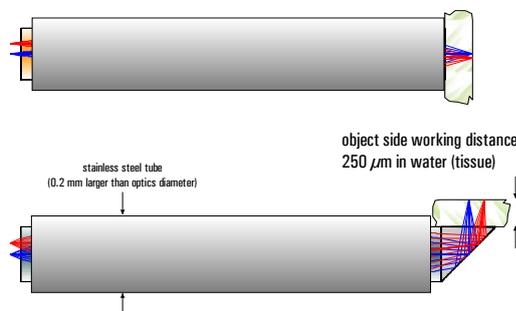


- object side working distance in water: 250  $\mu\text{m}$
- image side working distance in air: 100  $\mu\text{m}$
- design wavelength: 860 nm
- NA object / image side: 0.50 / 0.19
- Magnification: 1:2.6 / 1:-2.6 (depending on pitch length)

### Available lengths:

Diameter (mm)	Product Code	Length (mm)
0.50	NEM-050-25-10-860-S-0.5p	1.87
	NEM-050-25-10-860-S-1.0p	4.20
	NEM-050-25-10-860-S-1.5p	6.52
	NEM-050-25-10-860-S-2.0p	8.85
1.00	NEM-100-25-10-860-S-0.5p	4.38
	NEM-100-25-10-860-S-1.0p	9.22
	NEM-100-25-10-860-S-1.5p	14.07

- Other diameters (0.35 mm, 0.60 mm, 0.85 mm, 1.80 mm or 2.00 mm), other working distances or other design wavelength are available on request



### Available lengths:

Diameter (mm)	Product Code	Length (mm)
0.50	NEM-050-25-10-860-DS	3.79
	NEM-050-25-10-860-DM	9.89
	NEM-050-25-10-860-DL	16.00
1.00	NEM-100-25-10-860-DS	8.09
	NEM-100-25-10-860-DM	20.09

- Other diameters (0.35 mm, 1.80 mm), other working distances or other design wavelength are available on request

### Notes:

- Diameters are sole GRIN-optics diameters
- Optional the Endoscopes can be delivered in medical-grade stainless steel tubes (1.4301), with outer diameters of 0.70 mm for 0.5 mm optics and 1.2 mm for 1.0 mm optics. The tubes are mounted flush on the object side (tissue, high NA) for the side viewing version the prism is not protected by the tube.. On the image side, the optics sticks out of the tube by 50 – 500  $\mu\text{m}$ . Please add –ST to the product code if desired.
- The lengths can have a tolerance of +/- 5 %.
- The lenses are non-coated. For customized projects, the lenses can be AR-coated.
- A side-viewing scope using microprisms may be also possible on a customized basis (see left).
- Please ask for combination with imaging fiber bundles (Fujikura) as customized solution.
- For tolerances, handling and storage see page 26

\* Please note our partnership with Inscopix as our exclusive distributor for neuroscience applications in non-humans (see page 8).

## Extension of Partnership

### Brain Imaging – one of the most enabling applications of GRINTECH micro optics

Endomicroscopy using GRINTECH lenses and assemblies allows an *in-vivo* imaging access to deep tissue regions in the brain, especially in non-humans. It helps to understand disease formation and progression on a cellular level of the tissue.

We are pleased to inform that GRINTECH GmbH has expanded its strategic partnership with Inscopix Inc. beyond one-photon imaging to include exclusively serving customers on behalf of GRINTECH in two-photon imaging and across all non-human neuroscience research applications.

Inscopix offers innovative products and scientific consulting services for advancing neuroscience research and we are excited to be able to partner with Inscopix to serve a broader research community. Inscopix commits to continuing to support legacy GRINTECH customers with their microendoscope imaging needs across all neuroscience preclinical imaging applications. Inscopix Field Scientific Consultants and Inscopix's Support team will now be available to all legacy GRINTECH customers and to any customer interested in leveraging microendoscope imaging for their brain research, irrespective of whether the user or lab is a customer of Inscopix instrumentation. The expanded partnership aims to benefit GRINTECH customers and the broader Neuroscience research community with a dedicated neuroscience partner, enhanced scientific support and customer service, and volume-based pricing discounts.

Going forward, Inscopix will be your primary contact for ordering GRIN lenses for non-human Neuroscience research applications. If you have a one-time, custom GRIN lens order, Inscopix will work with GRINTECH to ensure that if Inscopix is unable to fulfill the order, GRINTECH will do so.

[www.inscopix.com](http://www.inscopix.com)

For more information, please contact [info@grintech.de](mailto:info@grintech.de)

## Tolerances / Handling Instructions

### Tolerances:

For of our single lenses we have the following fabrication tolerances and quality criteria:

#### Tolerances:

lens length z:  $\pm 5\%$  due to variations of the gradient constant  
working distance s:  $\pm 0.02$  mm (only LFRL- and CFRL lens series)  
diameter d:  $+ 0 / -0.01$  mm  
- tighter diameter tolerances on request

#### Surface quality:

5 / 3 x 0.025; L 3 x 0.005; E 0  
(defined by DIN ISO 10110-7:2000-02).  
The surface quality is defined within 90 % of the lens diameter.  
Outside of this area defects are allowed.

### Storage and Handling of Lenses

#### Storage

GRIN lenses and lens systems should be stored in a dry environment. For short term storage, the plastic box or foam packing in which the lenses are shipped will provide adequate storage.

Recommended storage temperature:  $-20^{\circ}\text{C} - 80^{\circ}\text{C}$ .

**Storage boxes should ensure that the lenses do not touch each other to prevent chipping and scratches. Best is to use the original box.**

#### Handling

Lenses should be carefully handled with plastic tweezers, preferably those with a tapered end. Lenses should be picked up out of their individual compartments by firmly holding each on its side cylinder surface (not the polished ends). Especially small sized lenses may stick to the lens box material and can be lost during removal.

#### Cleaning

If it is necessary to clean the lens surfaces due some dust or other contaminant which may impair the optical performance. GRINTECH generally recommends the use of ethyl alcohol as a cleaning solvent, maybe combined with some smooth lintfree lens cleaning tissue.

Acetone may also be used, but it should be pure enough, otherwise it might leave some residue on the lens surface.