

TOP® Liquid Lightguides

Specification Datasheet · TopRays Optical Fiber

Our liquid lightguides are available in multiple cross-section sizes with several jacket types to meet your specific needs. We also offer connectors with up to four poles.



Few Limitations

Liquid lightguides have few limitations: the cross-section must be round, and they can withstand extreme temperatures only briefly. Apart from rugged end fittings, their best performance is achieved in environments comfortable for people.

Four Proven Lightguide Types

We have developed four different liquid lightguides, differing mainly in the optical properties of the liquid used. The charts that follow detail the transmission spectra and other specifications of each.

Advantages Overview

- Rugged and durable, transmitting light at very high intensity
- Flexible and resistant to damage
- Aperture about twice that of quartz fiber light guides
- Competitively priced
- Excellent quality

A preferred alternative to quartz fiber bundles: thanks to its inherent design advantages, the liquid lightguide outperforms quartz fiber bundles. It can be likened to a single quartz fiber of very large diameter, its cross-section resembling an open pipe. This design transmits light by total internal reflection and uses the entire effective area. By comparison, a quartz fiber bundle is like many small tubes inside a large pipe, with unused gaps between the fibers that form dead zones blocking light transmission. Our liquid lightguide design delivers much more intense light to the target.

Versatility: our liquid lightguides consist of polymer tubes with a liquid core, which are durable and carry no risk of breakage. By comparison, fiber bundles can suffer fatigue and eventually break, especially under frequent bending. Liquid lightguides offer a significantly larger aperture, higher efficiency and broad applicability across many uses, making them an ideal solution for scenes requiring uniform, high-intensity illumination. Our products cover a range of spectral bands from ultraviolet to infrared and offer a wide choice of end fittings. If you would like to learn more about our liquid lightguides, please contact us. We are happy to discuss the solution that best suits your needs. With these many possibilities, we continue to work with customers to explore innovative applications.

Standard End Fittings (UV, UV_VIS Series)

Effective core Ø [mm]	End fitting D0 [mm]	End fitting D1 [mm]	End fitting L1 [mm]	Protective tube D2 [mm]	Protective tube L2 [mm]	Min. bending radius D3 [mm]
2	4	6.7	8	20	5.5	30
3	5	20	9	24	7	40
5	7	20	10	24	9.5	60
6.5	9	20	13.5	38	11	80
8	10	20	15	40	12.5	100
10	14	20	19.8	41	15	200

Other end fittings and custom designs are available on request.

Specifications

Series	Core diameter	NA 2α	Applications and spectral range	Features
DUV_LLГ	3, 5, 8 mm	50°	Non-adhesive UV curing in wafer manufacturing, lengths up to 5 m (15 ft). Spectrum: 220 nm – 650 nm.	Excellent light stability even in the UVC band, suitable for high-power UV lasers. Recommended sources: deep-UV mercury lamps, xenon lamps and excimer sources. Long-term operating temperature range: +5 °C to +30 °C.
UV_LLГ	2, 3, 5, 6.5, 8, 10 mm	72°	UV curing and fluorescence detection, lengths up to 20 m (60 ft), spectral range 280 nm to 650 nm.	Excellent transmission, withstands UV radiation up to 5 W, suitable for harsh environments. Recommended sources: mercury lamps, xenon lamps, halogen lamps and LEDs. Long-term operating temperature range: -5 °C to +35 °C.
UV_VIS_LLГ	2, 3, 5, 6.5, 8, 10 mm	72°	Excellent white-light illumination, lengths up to 30 m (100 ft). 340 nm – 800 nm.	Excellent transmission from near-UV to far-red, lengths up to 30 m, suitable for extremely harsh environments. Recommended sources: halogen lamps, LEDs, xenon lamps and metal-halide lamps. Long-term operating temperature range: -5 °C to +35 °C.

Series	Core diameter	NA 2α	Applications and spectral range	Features
VIS_NIR_LLG	3, 5, 8 mm	62°	Illumination in the visible and near-infrared range, lengths up to 4 m (12 ft). 420 nm – 2000 nm.	Efficiently transmits high-power near-infrared radiation at the watt level. Built-in long-pass filter removes radiation below 420 nm. Recommended sources: xenon or halogen lamps, Nd-YAG lasers or semiconductor lasers. Long-term operating temperature range: +5 °C to +35 °C.

Spectral Characteristics

Test conditions: 2α = 50° (DUV_LLG 2α = 34°), length 2000 mm, effective core Ø5 mm

Usage Instructions

- Long term: minimum -5 °C (+23 °F), maximum +35 °C (+95 °F)
- Up to several days: minimum -15 °C (+5 °F), maximum +50 °C (+122 °F)
- Up to several hours: minimum -20 °C (-4 °F), maximum +70 °C (+158 °F)

Recommended transport, storage and operating temperatures:

Stability at extreme temperatures depends on both temperature and time. Exceeding the above limits may cause bubbles to form inside the liquid; these usually disappear again after storage at room temperature for a few days.

One Great Idea, Endless Possibilities

- Multi-branch liquid lightguide with integrator (UV_VIS_LL)
- Dimension unit: mm · effective core Ø3 mm
- Single-pole or multi-pole lightguides
- Light input: D-shape
- Light output: standard
- Cladding: PVC or silicone