

PIR-fibers



The development of specialty fibers for the Mid-Infrared region has resulted in a unique product - Core / Clad Polycrystalline Infra-Red (PIR-) fibers. The PIR fibers are non-toxic, very flexible, transparent across a broad spectral region 4 - 18 μm and capable of operating over the wide temperature range of 200°C up to +250°C. They are manufactured in a core/clad structure of superior quality from pure AgCl: AgBr solid solution crystals using an innovative vacuum extrusion method. They possess by no aging effect compared to an alternative bare core fiber. The range of PIR-fiber cables are available with a durable PEEK polymer jacket and terminations using either an SMA - type connector with a Ti or polymer ferrule or special one, manufactured on customer request. A wide variety of different optical coupling units can also be designed & fabricated for specialized customer requirements.

FEATURES

High transmittance from 4 μm up to 18 μm . Suitable for CO₂ - laser power delivery up to 50 W. Low Attenuation at 10.6 μm (0.1-0.5 dB/m). Fiber diameters from 0.3 to 1.0 mm (on request). Fiber lengths up to 20 m (for 0.5 mm diameter). No aging effect.

FIBER DESIGN AND PROPERTIES

FIBER SPECIFICATIONS Fiber 400/500, 630/700, 900/1000 μm diameter (standard)

Transmission range 4-18 μm

Attenuation at 10.6 μm 0.1-0.5 Db/m

Refractive index 2.15

Effective NA 0.25

Laser Damage Threshold for cw CO₂-laser >12 kW/cm²

Melting point 415°C

Tensile strength >100 MPa

Minimum Bending Radius (fixed) 10x[Fiber Diameter]

Minimum Elastic Bending Radius 100x[Fiber Diameter]

Standard fiber/cable diameters Other fiber diameters in 0.3 - 1.5mm range are also available upon the request for special fabrication Product code	Core [μm]	Clad [μm]	Jacket's inner diameter [μm]	Jacket's outer diameter [μm]
PIR 400/500	400	500	740	1590
PIR 630/700	630	700	1400	3175
PIR 900/1000	900	1000	1400	3175

PIR 400/500 400 500 740 1590
 PIR 630/700 630 700 1400 3175
 PIR 900/1000 900 1000 1400 3175

Cable termination with a special Ti-ferrule SMA-connector: for low power (spectroscopy & radiometry) applications

for high laser power delivery - free standing fiber end

standard cable length - 1m & 2m

PIR-fiber end-surface low cost, high performance - standard treatment Cutting

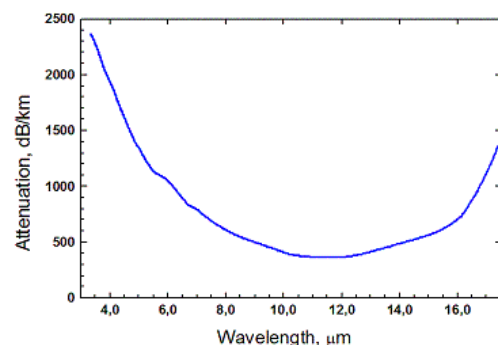
Polishing for special application, including AR-coating - on request

SMART for reduced reflection of high CO₂-laser intensity - on request

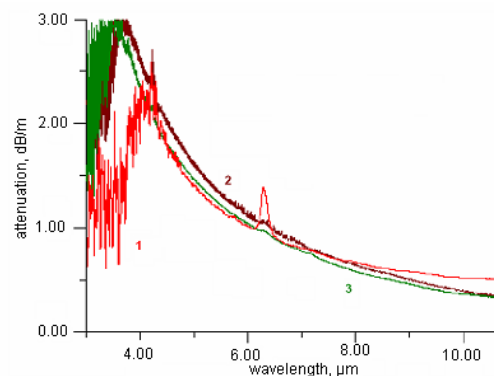
OPTIONS accessory kits for remote spectroscopy with FTIR, QCL and TDL-spectrometers

pig-tailing of IR-detectors: TE- & LN-cooled MCT, PbSe, thermopiles, etc.

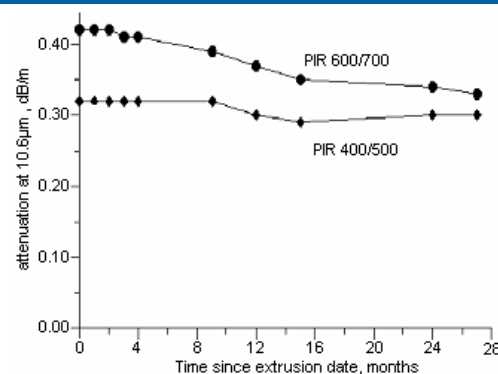
Spectral Attenuation PIR fibers



1 - PIR 400/500 after 2.5 year storing (red)
 2 - PIR 600/700 after 2.5 year storing (purple)
 3 - PIR 400/500 after 1 month storing (green)



Attenuation at 10.6 μm in core/clad PIR-fibers measured within 28 months storage after extrusion



APPLICATIONS

- Flexible delivery system for CO and CO₂ laser.
- Flexible IR-imaging systems.
- Remote non-contact pyrometry in the 100-600K range.
- Fiber probes for remote in-line, in-vivo and process IR - spectroscopy.

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