Refractive Index Measurement on Optical Fiber

AMS Technologies’ Measurement Services with Interferometric Measurement Technique

- Multiwavelength
- Sub-μm spatial resolution
- Applicable to any fiber type
- Measure splices, tapers, couplers
Measurement Services with Interferometric Measurement Technique

- **Refractive index measurement on optical fiber**
  With the IFA-100 Multiwavelength Refractive Index Profiler AMS Technologies can offer measurement services for product development, good income monitoring and forensic analysis on optical fibers. At our testing facility in Munich we can secure quick sample turnaround and traceable confidentiality of measurement result.

**Added information derived from Refractive index profile**

The refractive index profile allows determination of key transmission parameters like Chromatic dispersion, Mode Field diameter, Bandwidth, Birefringence and Polarisation Mode Dispersion (PMD).

**Line plots and Tomography scans**

The measurements can be taken in one dimension giving a line plot of the refractive index at any given cross section of the fiber. This measurement assumes the fiber to be symmetrical and symmetrical geometry is assumed for the computation of the refractive index profile. For the two dimensional measurements several lower dimensional projections are combined to form a full surface profile of the refractive index. This computer tomography based approach does not take assumptions for the fibers being symmetric.

**Refractive index along fiber axis for component manufacturing**

The refractive index can be measured along user-defined positions along the fiber axis. This allows for example to verify the design of a mode adapter when splicing different type of fibers or to measure the average refractive index of the irradiated core in a grating region and compare it to unprocessed fiber. Moreover special waveguide structure written into an optical fiber can be verified.

![Tomography Scan](Photo Courtesy of OZ Optics)

![Line Plot](Photo Courtesy of OZ Optics)
Measurement services are categorized in four groups:

**One-Dimensional refractive index measurement**
Fibers having a diameter between 80µm to 400µm, axisymmetric (not PM or star shaped, all internal structures axisymmetric), single wavelength

**Two-Dimensional refractive index measurement**
Fibers having a diameter between 80µm to 400µm, non-ax symmetric (PM or star shaped), single wavelength

**One-Dimensional stress measurement**
Axial refractive index birefringence for axisymmetric fibers having a diameter between 80 to 400µm

**Three-Dimensional refractive index measurement**
Measurement at user-defined position along the fiber axis, axis- or non-axisymmetric, single- or multiwavelength

Measurements can be done with following specification:

- **Fiber diameters:** 40µm to 400µm
- **Measurement wavelength:** 450nm to 980nm
- **Fiber material:** Silica glass, non-silica glass, plastic
- **Accuracy of index of refraction:** +/- 0.0001
- **Spatial resolution:** ~ λ/2 (i.e. 250 nm for 500 nm wavelength)
- **Accuracy of stress measurement:** +/- 5 MPa

Cover image shows a large RIC preform to be drawn into an optical fiber of 125 µm diameter for the production of optical fibers for the telecommunications industry.

*Photo Courtesy of obs/Heraeus Quarzglas*
WHAT CAN WE DO FOR YOU?

Please contact us for further information