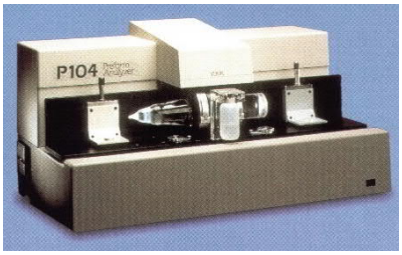
FOR SALE:

P104 Preform Analyzer

Introduction



Preform analyzer is one of the most important measurement instruments in fabrication of optical fibers, be it telecom or special fibers. York Technologies developed P104 analyzer two decades bac, but these instruments keep providing dependable and accurate preform refractive index profile measurements. Until recently, P104 analyzer was produced and marketed by Photon Kinetics.

P104 preform analyzers are still used in many academic and research institutions around the world. Investment into new preform refractive index measurement instruments presents significant cost for such institutions, small laboratories, and start-ups.

Since more than two decades, OCTech provides support to such customers, offering analyzer upgrades or reconditioned instruments. Over 20 preform analyzers were supplied or upgraded for global customers. OCTech buys second hand preform analyzers and refurbishes them according to customer's requirements.

Current offer

OCTech's current offer is for Photon Kinetics P104 preform analyzer, fabricated in 2004, and delivered to university lab in Indochina. The instrument was used for a few years, but the optical fiber and preform program was stopped during previous decade. Instrument was cleaned and properly stored until OCTech purchased it.

Fig2: P104 unit, received (in excellent condition) from previous owner.

Above photo shows the instrument in as-delivered condition, showing no visible wear or damage. Delivered measurement system also includes a calibration tube, sample single mode etalon preform and measurement cells type B,C, D and E (tube calibration). Below photo shows P104 with one measurement cell installed, while images on the right show calibration data by the original supplier and current by FOIS UK.

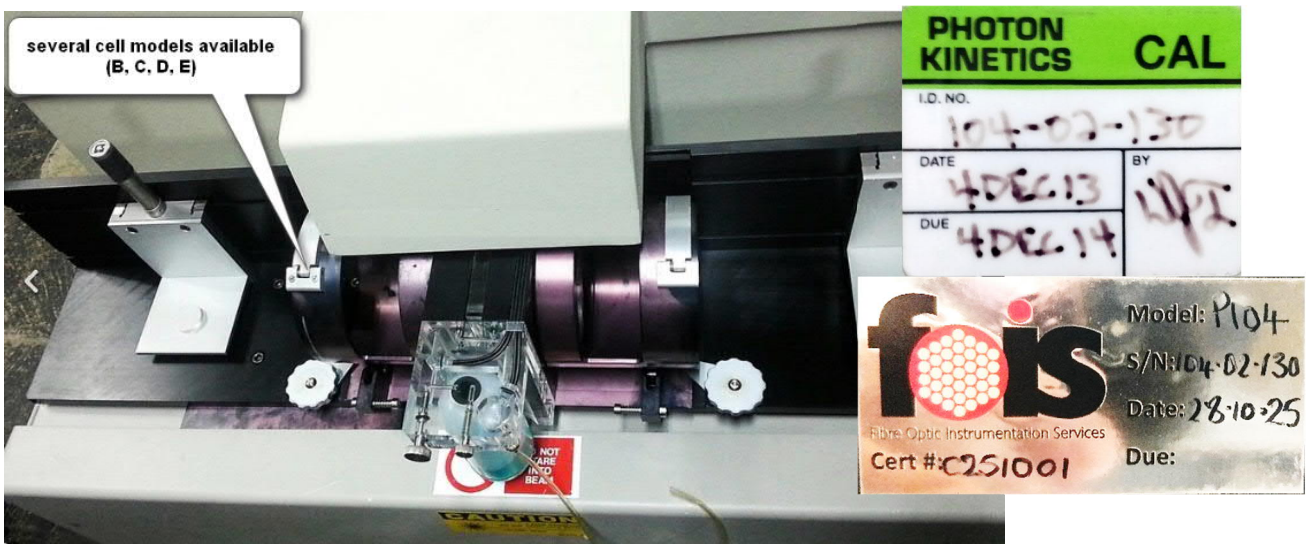


Fig3: P104 unit with measurement cell (left) and calibration sticker from Oct 28, 2025(right).

The originally supplied computer and software is not available and is replaced by OCTech WinP104 control system and software (see below for more details).

P104 reconditioning and upgrade

Above described P104 preform analyzer has been thoroughly cleaned, with consumable parts exchanged and then fully checked in operation, measuring different types of optical fiber preforms (MCVD, rare-earth doped, GI and SM, OPD deposited rods, tubes with thin deposited layer on outside or inside surface). Instrument was calibrated by FOIS UK, OCTech's partner for maintenance, services, and calibration of preform analyzers.

Calibration was done using original York Technologies calibration and setup software, operating from Hewlett-Packard (HP) BASIC instrument controller. Measurements were done using both original York HP and OCTech's own WinP104 preform analyzer software.

WinP104 configurations and delivery scope

Above described preform analyzer is delivered in one of the two configurations:

1. standard P104 configuration as horizontal desktop instrument, recommended when required number of measurements is low or the unit is only used occasionally,
2. vertical configuration with automatic preform feed and rotation, for fast multiple position/angle measurements, required in today's high tech index profile measurement.

Standard P104 configuration

P104 in standard configuration is delivered as the instrument shown in Fig 2 above, as horizontally installed unit. Delivery includes measurement cell (see below, as selected by customer), HP-IB to USB interface and Windows 11 PC computer with WinP104 software.

In this configuration operator will be required to move and rotate the preform in the measurement cell manually, instructed about the required actions by measurement software on PC screen. Operation may require several cell filling/emptying operations and may consume more time. As the measurement cell is still equipped with rubber seals on both cell sides, index matching oil leakage may present a problem.

Vertical P104 configuration

For more demanding production or development environments, with more preforms produced, or with requirements for more detailed index profile analysis (rare earth-doped fiber preforms, PM gyroscope fiber fabrication, …) vertical configuration with automatic preform positioning (position and angle) is highly recommended. This option permits very fast accumulation of multi-position deflection function scans and direct transfer to database for further processing. In this configuration, P104 performs like other available vertical preform analyzers, having an open measurement cell with tank below, with no oil leakage problems.

Delivery scope of P104 in vertical configuration includes:

- vertical frame with redesigned electrical cabinet and electronic boards
- base plate with complete P104 optics
- measurement cell (for example type D) with expansion vessel in vertical position
- tank with index matching liquid below the measurement cell, with dual wall for thermal bath liquid circulation for better oil temperature stabilization (no thermal bath included),
- vertically positioned linear actuator with stepper motor, motor drive, and limit switches,
- hollow axis rotary table for preforms with up to 45 mm preforms, with preform chuck (self-centering scissor design),
- instrument controller: state-of-art PC computer with Windows 11, and WinP104 software (see below), developed by OCTech,
- HP-IB to USB interface module from Keystone/Agilent, for communication between PC and P104.

Fig 4: WinP104 preform analyzer in vertical configuration

WinP104 software and control system

To replace obsolete Hewlett-Packard computer and HP Basic software, OCTech has developed Windows-based software and interface upgrade, permitting users to carry out measurements under Window environment on a PC computer, communicating with the instrument over USB to HP-IB. Software has many functions and options that make it similar to original YORK control software and offers several features that are lacking even in the new generation preform analyzers.

Key WinP104 software features:

- P104 operation in Windows environment, using interface to original control electronics in the unit,
- Collection of measurement data, deflection function centering, (as option) evaluation of preform geometry from deflection function curve,

- Calculation and display of refractive index profile(s), with up to 8 cursors for measurement of index difference to matching liquid or silica layer,
- Results stored in internal format database, with export of deflection function curves or preform index profiles to spreadsheet programs (in comma delimited or text format), for further treatment by customer's software.

Deflection function centering is very important feature (missing in some commercial preform analyzers) in index profile measurement on special optical fiber preforms, which are not ideally circular or symmetric. Therefore WinP104 is well-suited for use in R&D laboratories, institutes and universities, or where complex and novel optical fibers are developed.

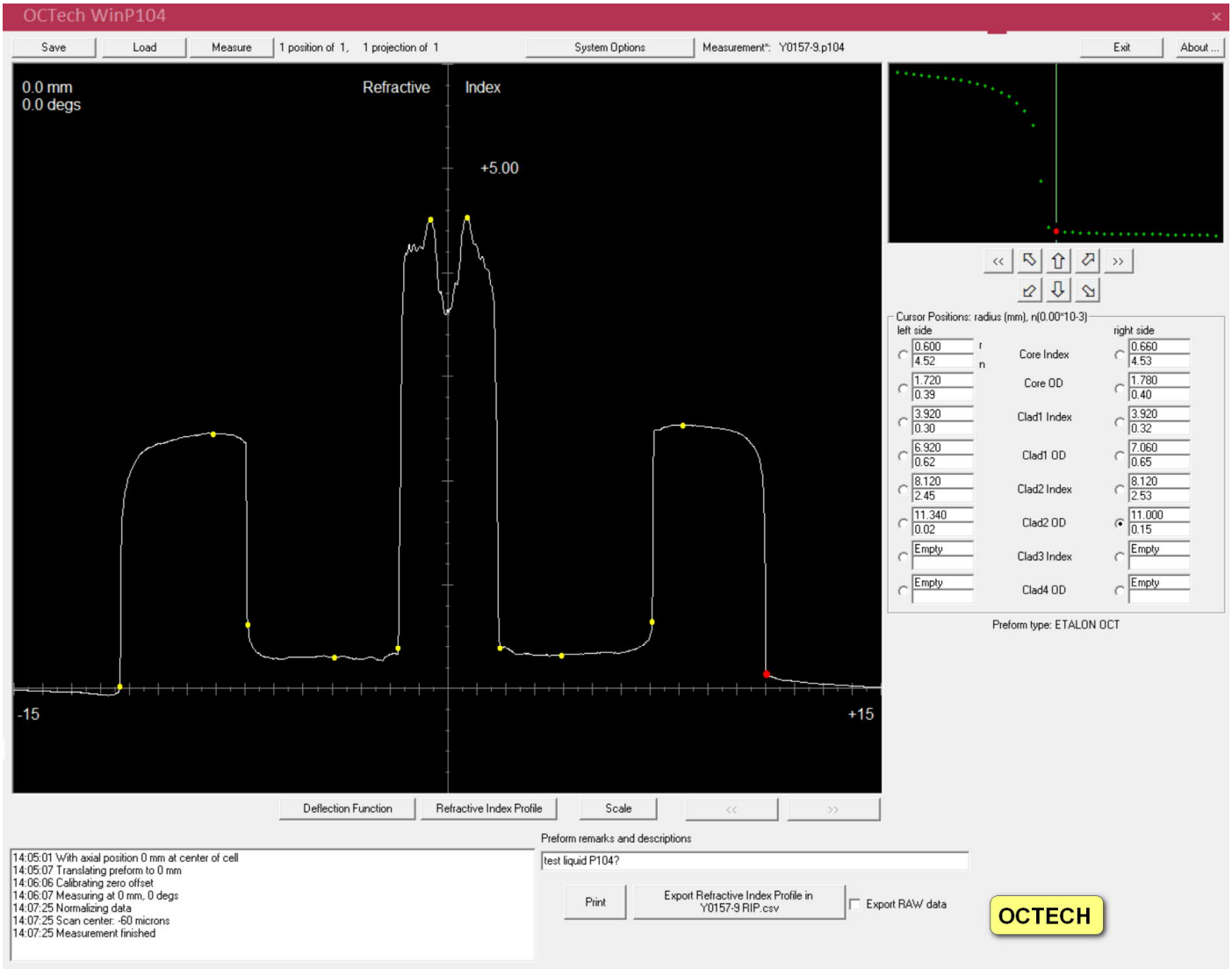


Fig 5: WinP104 software main window with measured profile and 6 cursor positions

Specifications

OCTech's upgrades preserve the original precision and repeatability of the P104 refractive index profile measurement. Below table is specification for P104 preform analyzer, as provided by the original supplier.

Measurement Specifications	
Speed (start of scan to profile display)	115 sec. for 1000 data points (5µm step size)
Measurement Wavelength	632.8 nm
Maximum Measurable Deflection Angle	20 degrees
Accuracy[1]	
Refractive Index[2]	± 0.00020
Repeatability[1] (std dev, 1 sigma, 5 repeat scans, preform unmoved)	
Refractive Index Difference Between Cladding and Core[3]	less than or equal to 0.00005
Measurable Preform Types/Sizes	
Types Measured	Single-mode, multimode, tubes, rods
Maximum Diameter	80 mm
Minimum Diameter	5 mm
Maximum Measureable Lengths	100 cm for an 80 mm diameter preform 150 cm for a 45 mm diameter preform 200 cm for a 40 mm diameter preform
General Specifications	
Temperature Range	15°C to 30°C, operating (< 80% humidity) 0°C to 40°C, storage (20% to 80% humidity)
Index Matching Oil	Cargille code 50350; matched to silica at 25°C
Physical Dimensions	60 cm x 86 cm x 50 cm
Workspace Required	200 cm x 75 cm x 125 cm
Shipping Weight	100 kg (220 lbs)
Power Requirements	90-139 VAC, 50-60 Hz, 200 W or 180-260 VAC, 50-60 Hz, 200 W

Notes:
[1]Specifications at 25°C.
[2]For a typical high quality, graded-index preform of NA < 0.2 and ovality < 1.0% and for a typical high quality single-mode preform of NA < 0.13 and ovality < 1.0%. For index difference calibration, all P104 systems are calibrated using a Calibration Tube which is itself calibrated against an NPL certified calibration tube.
[3]Repeatability is defined as the standard deviation of the index difference between the refractive index of the cladding (average index over 1 mm of cladding region) and the core of a multimode preform (core index is the peak of a parabolic fit to the core region).

Testing and inspection

PK2600 preform analyzer can be inspected and checked at OCTech's site in Logatec, Slovenia. OCTech can provide video sessions (remote desktop + internet chat) for remote access checking, using own etalon preforms or by measuring customer provided preforms.

Service and calibration:

Servicing P104 instruments with or without OCTech upgrades, is provided by FOIS Fiber Instrumentation Services UK (link http://fois-uk.com/). FOIS provides upgrade installation and instrument start-up services on request. FOIS also offers calibration services for all York-developed preform analyzers and other instruments used in fiber industry.

Pricing

Due to instrument age it is offered under favorable sales conditions, making it very suitable for small fabrication facilities, institute or university labs or other R&D facilities with limited investment budgets.

Additional information

For quotes and sales conditions please write to borutl@octech.si or call +386 41 310 327