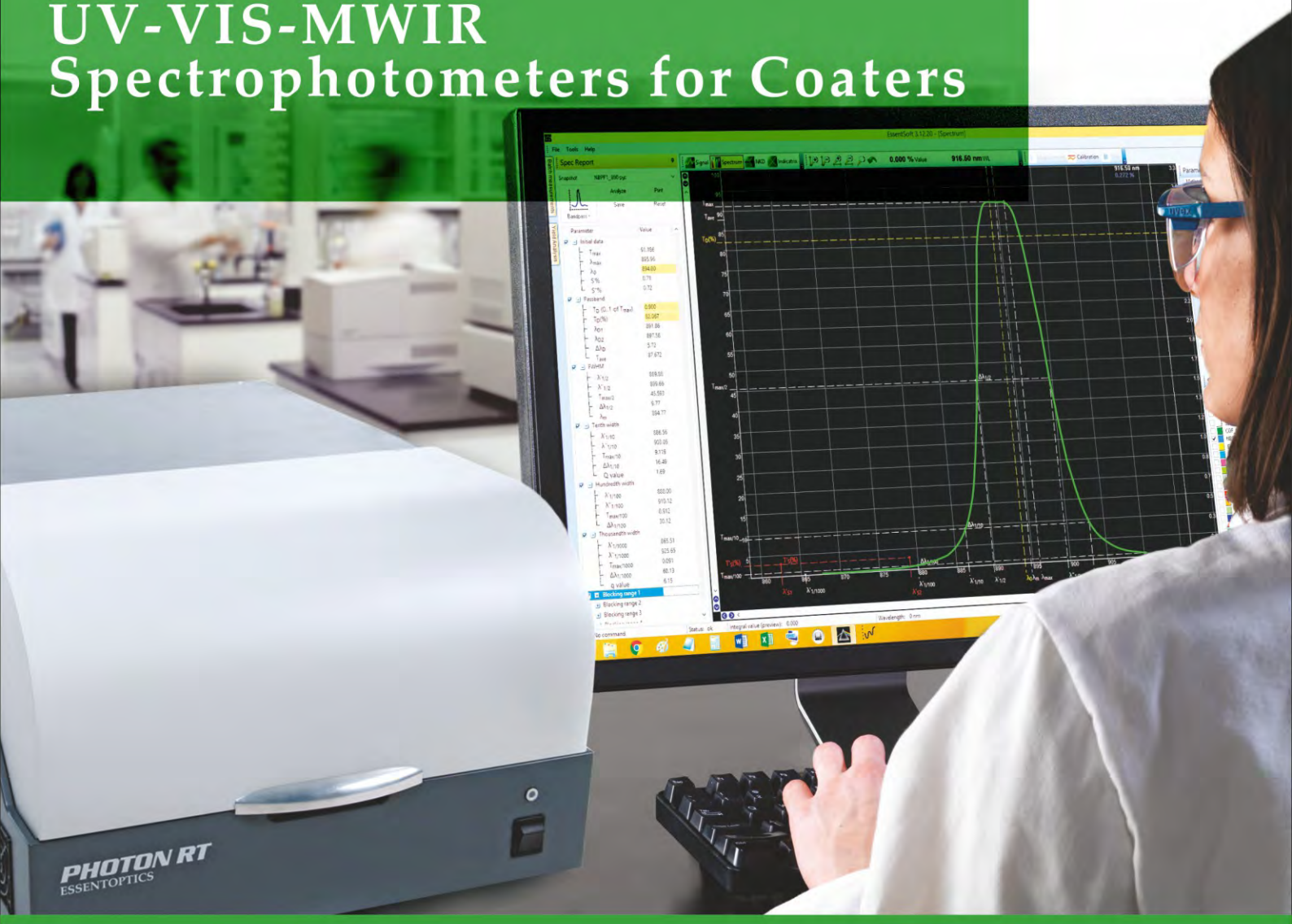
# PHOTON RT

## UV-VIS-MWIR
## Spectrophotometers for Coaters

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# PHOTON RT

## INTRODUCTION

**PHOTON RT** is the only spectrophotometer on the market designed exclusively for optical coaters. The instrument offers a set of fine-tuned, field-proven and unique features that add pleasure to metrology routine, improve measurement competences and help refine measurement procedures.

## DESIGN ADVANTAGES

**Built-in broadband high contrast automatic polarizers** ensure meaningful measurements at variable angles and polarizations seamlessly from UV (200 nm) to MWIR (5200 nm)

**Light sources** ensure UV-MWIR measurement and verification of wavelength calibration with a click of a button


**Unique chromatic aberration correction technology** ensures worlds only UV-MWIR measurement capability in a single instrument

**Precise variable angle rotation drive** for sample stage and photodetectors with 0,01 degree step

**Built-in beam displacement compensation** technology for precise transmittance measurement of thick samples at any angles

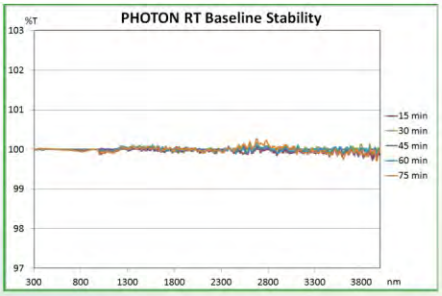
**Small footprint** saves space in your lab

## PHOTON RT: FAST FACTS

1) The only instrument designed exclusively for coaters
2) Unattended operation, no attachments required
3) Measure optics in minutes, not hours or days
4) No baseline recalibration with the change of angle of incidence or transmittance/absolute reflectance

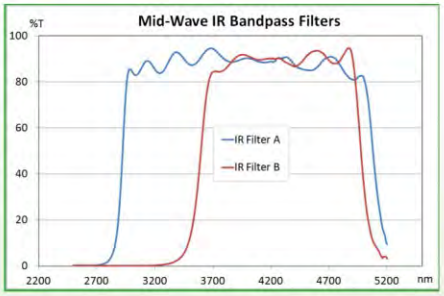
# MEASUREMENT CAPABILITIES

## Baseline Stability



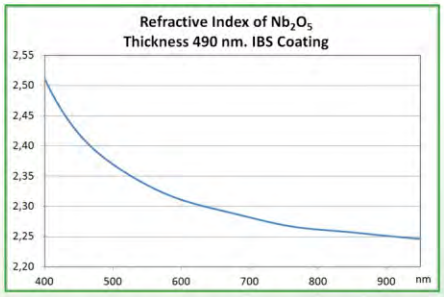

As shown above, PHOTON RT demonstrates very good baseline stability over time and at record-wide UV-MWIR wavelength range.

## Mid-Wave Infrared Measurement



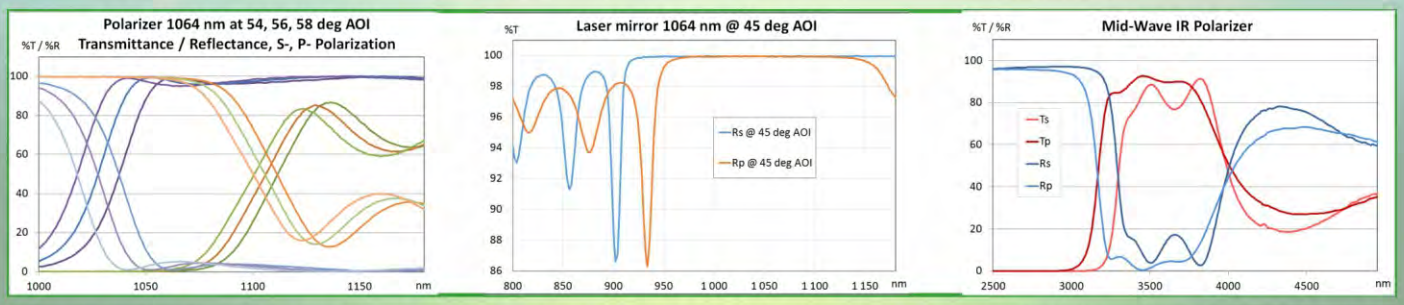

PHOTON RT is perfectly suited to meet the fast growing demand for precise measurements of parts with coatings designed for MWIR wavelength range (advanced laser systems and thermal vision instruments), both at normal AOI and at variable angles and polarizations.

## Unattended Measurement and Calculation of Complex Refractive Index



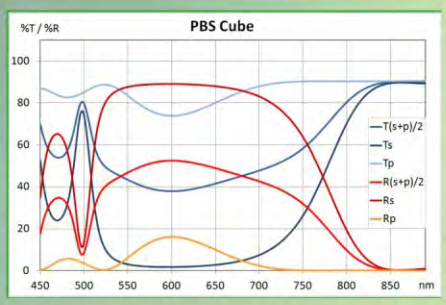

Single layer coatings can be measured with built-in proprietary software feature for subsequent instant calculation of complex refractive index and layer thickness. The example is shown for Nb2O5 layer, 490 nm thickness, produced by ion-beam sputtering technology.

## Variable Angle and Polarization Dependent Measurements



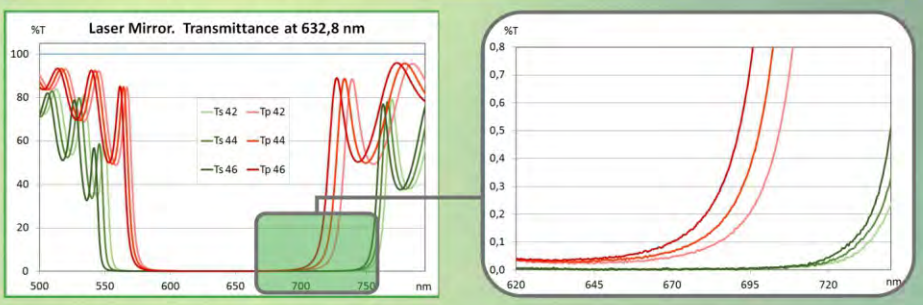

Powered with built-in high-contrast broadband polarizers, PHOTON RT spectrophotometer is uniquely differentiated with capability to measure at variable angles and polarizations unattended in just a few minutes.

## Unattended Measurements of PBS cubes




PBS cubes are among widely available yet challenging to measure optical components. Shown above, a PBS cube with uncoated front surfaces measured unattended in less than 2 minutes, ensuring the beam entering exactly the same point on the cube both for Ts/Tp and Rs/Rp measurements.

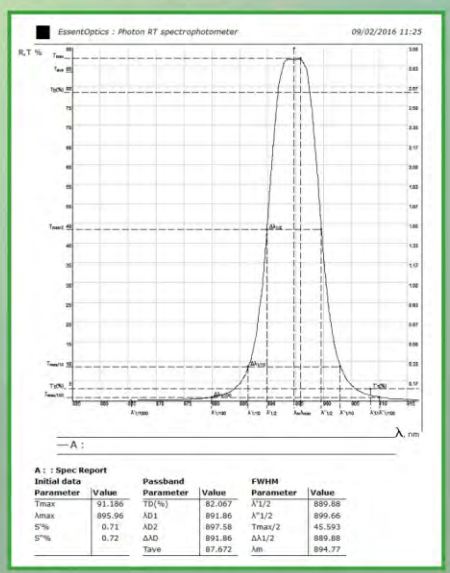
## High Accuracy Measurements




Transmittance measurement of laser mirror optimized for 632,8 nm at 44 degrees angle of incidence.The measurement results also shown for 42 and 46 degrees AOI to verify performance of the coating over +/- 2 degrees angle of deviation.

## Qualitative and Quantitative Analysis of Measured Coatings

Yield Analyses and Spec Report – powerful software features helping optical experts to perform qualitative and quantitative analysis of typical coatings with a click of a button, like cut-off filters and narrow bandpass filters. The new time-saving and efficient software capabilities are used for QA/QC approval of the coatings against pre-set acceptance limits, and instant generation of specification data for analyzed spectra.



# Specifications

| PARAMETER | DESCRIPTION |
|---|---|
| **OPTICAL CONFIGURATION** | |
| Optical scheme of monochromator | Czerny-Turner |
| Optics | Mirror, Al + $SiO_2$, Al+$MgF_2$ |
| Reference channel | Yes |
| Wavelength sampling pitch, nm | 0,5 to 100 |
| Wavelength scanning speed, nm/min | 3 000 (at 5 nm wavelength sampling pitch) |
| Spot size on the measured sample, mm | 6x2 |
| Photometric functions | %T, %R, A, D |
| Variable angle measurement | Transmittance: $0^0$-$75^0$ AOI<br>Specular reflectance: $8^0$-$75^0$ AOI |
| Tuning pitch angle of sample table | 0,01˚ |
| Turning pitch angle of photodetectors | 0,01˚ |
| Positioning accuracy of the tuning pitch angle of sample table | 0,01˚ |
| Effective wavelength range, nm (instrument configuration options) | 185-1700, 185-3500, 190-4900, 380-1700, 380-3500, 380-5200 |
| Spectral resolution, nm<br>185 - 990 nm<br>990 - 2450 nm<br>2450 - 4900 / 5200 nm | <br>0,6<br>1,2<br>2,4 |
| Wavelength accuracy, nm | +/- 0,24 |
| Wavelength repeat accuracy, nm | +/- 0,12 |
| Scattered light level, % max (@ 532 nm) | < 0,002 |
| Angle of beam divergence | +/- 1˚ |
| Photometric accuracy | Certified according to NIST SRM 930: +/- 0.003 Abs (1 Abs)<br>Certified according to NIST SRM 1930: +/- 0.003 Abs (0.33 Abs), +/- 0.006 (2 Abs) |
| Photometric repeat accuracy | Certified according to NIST SRM 930: 0.0004 Abs (1 Abs)<br>Certified according to NIST SRM 1930: 0.0001 Abs (0.33 Abs), 0.005 (2 Abs)<br>Determined using 0.1-second accumulation, maximum deviation for 10 subsequent measurements |
| Stability of baseline (UV-VIS), %/hour ** | 0,1 (30 minutes warm-up time) |
| Light sources | Deuterium lamp, Halogen lamp,<br>Hg-Ar wavelength calibration verification calibration lamp |
| Built-In broadband high-contrast polarizers, unattended operation | S, P, S+P+(S+P)/2, Average , user-defined S:P ratio for incident beam<br>Wavelength ranges: 380-2200 nm, 220-2200 nm, 220-5200 nm, 380-5200 nm |
| **SAMPLE COMPARTMENT** | |
| Sample table | For measurement of transmission and reflection of plane samples with size bigger than 12x10 mm |
| Independent setting | Independent positioning for sample table and photodetectors unit |
| Synchronized setting | Synchronized positioning for sample table and photodetectors unit depending on the chosen photometric function (R or T) |
| Size of samples | Min. 12x10 mm – for measurement at 0-10 deg incidence angles.<br>Min. 12x25 mm - for measurement at 10-75 deg incidence angles<br>Max. sample size – up to Ø120mm |
| **INTERFACE, DIMENSION AND WEIGHT** | |
| Interface | USB 2.0 |
| Power consumption, Wt | 110 |
| Power input | 110/220 V, 50/60 Hz |
| Width x Depth x Height, mm (inches) | 420 x 610 x 270 (16.5" x 24" x 10.5") |
| Net weight, kg (lbs) | 45 kg (99 lbs) |
| Supply set | PHOTON RT Spectrophotometer, Operation Manual, USB cable, power cable, software package, spare halogen lamps. |

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