

# METROLOGY

A close-up photograph of a person wearing blue nitrile gloves using a precision metrology instrument, likely a coordinate measuring machine (CMM), to measure a small, light-colored circular part. The instrument is mounted on a black machine structure with various adjustment knobs and a probe. The background shows a blue scale bar and a perforated metal table surface. The word "METROLOGY" is overlaid in white capital letters at the top right.

Altechna

# Altechna

Altechna is a Lithuania-based custom laser optics company with worldwide customers. We develop and provide complex technological solutions and custom-tailored designs of laser optics and accessories for laser applications for the industrial, defense and academic customer.

Our focus is on listening to and understanding needed requirements, selecting the best methods for producing quality laser optics, and shipping them in a timely manner. Employing more than 120 highly competent professionals, we have accumulated all the necessary know-how to evaluate and complete every order with attention to the finest details. Altechna is best defined by its customer-oriented approach and its innovative technological solutions, expertise and reliability.

## Quality Assurance Policy

### LEAN manufacturing



### Copy-exactly!



### On time delivery



### ISO 9001:2015



# Metrology

## Description

Our production capabilities are combined with in-house quality control and metrology laboratory. Our goal is to assure that after fabrication every element passes through the final quality testing steps such as shape, surface quality, surface figure, dimension tolerances, parallelism, spectral characteristics and etc. We believe that quality control is the most important aspect of all steps of optical component production whether the optical component goes to a simple optical or a complex industrial system. Altechna cares about your success in experiments, final product performance and quality excellence.

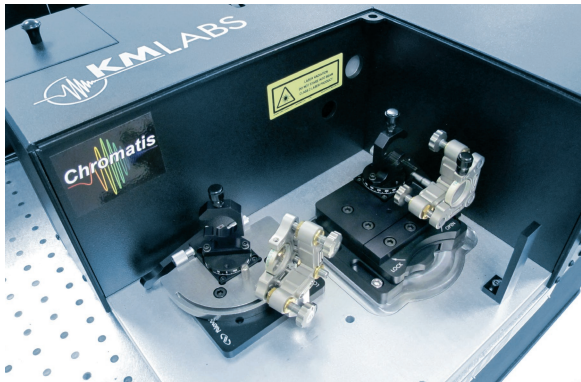
## In partnership with Vilnius University and local R&D companies we perform the following test procedures:

- Laser Induced Damage Threshold (LIDT) measurements according to ISO 21254-1-2, -3 and -4 standards for wide range of laser wavelengths
- Optical absorption tests according to ISO 11551 standard
- Total scattering measurements according to ISO 13696
- Transmittance and contract AOI=0° from 4900 to 20000 nm
- Surface roughness measurement with atomic force microscope

# In-house Metrology

## Dispersion measurement instrument – “Chromatis”

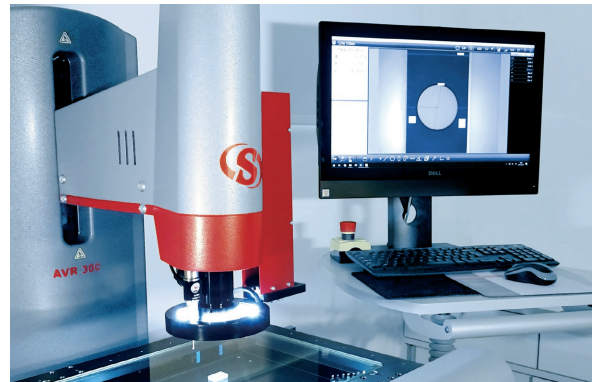
- Measurements of components and coatings phase (rad) / Group delay (fs) / GDD (fs<sup>2</sup>) / TOD (fs<sup>3</sup>) / FOD (fs<sup>4</sup>)
- Spectrum range: 500 - 1650 nm. Resolution up to 5 fs<sup>2</sup>
- Measurements for s and p polarization simultaneously in reflection and transmission modes
- Angles of incidence from 0° to 70°
- Mirror pairs are measured at angles from 6° to 54°
- The white light source allows characterization of mirrors designed for Ti:Sapphire (800 nm), Yb:fiber (1030 nm), and Er:fiber (1550 nm)



Chromatis (KMLabs)

## Automatic CNC vision metrology system with Renishaw touch probe kit

- Dedicated for very accurate and repetitive dimensions measurement for optical and mechanical components
- Full CNC X-Y-Z motorized positioning: 300 x 200 x 200 mm
- Accuracy: 1.9 µm + 5 L/1000 for X and Y, 3.5 µm + 5 L/1000 for Z
- Video edge detection (VED)
- 2D geometrical constructs plus height
- Field-of-view (FOV) measurements integrated with stage motion, from 12 mm to 1 mm
- Telecentric 12:1 Zoom lens (total mag.: 26x-310x)
- Reports in CSV, TXT, PDF or DXF file format



Starrett AVR300

## Temperature and humidity chamber

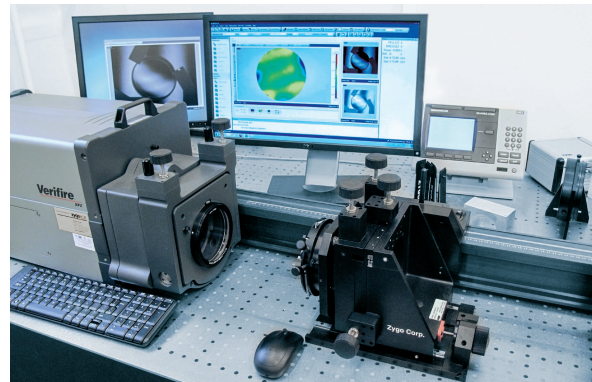
- For coatings, glued parts and materials tests
- Static and dynamic environmental tests according to MIL-PRF-13830B, MIL-C-4897A, ISO 10110 and other durability requirements
- Temperature range from -50 °C to +155 °C. Stability  $\pm 0.5$  °C
- Relative humidity range is 30-95%
- 22.5 L capacity
- Samples up to 290x250x240 (WxHxD) mm



Temperature and Humidity Chamber (Espec)

## Interferometer ZYGO Verifire XP/Z

- Interferometric measurements for s and p polarization (Internal Zygo polarizator option). For polarization sensitive optics, such as laser crystals
- Clear aperture up to 100 mm
- Zygo transmission /reference flats ( $< \lambda/20$  @ 632.8 nm) for surface flatness (PV/power/irregularity/RMS), wavefront distortion and parallelism measurements
- Zygo f/0.75, f/1.5, f/3.3, f/7.1, f/10.7 transmission / reference spheres ( $< \lambda/20$  @ 632.8 nm) and “Renishaw” guide rail (1500 mm) for radius metrology to test spherical surfaces for form irregularities, wavefront distortion and Radius of Curvature with radius of  $\pm 4 - \pm 800$  mm



Verifire XPZ (Zygo)



## Spherometer with centering module

- For spherical and cylindrical lens radius of curvature, focal length and centration measurements
- Additional accessories extend our capabilities to measure EFL values up to  $\pm 5000$  mm, ROC –  $\pm 750$  mm
- Non-contact and less damaging method
- Accuracy: 0.05% – 0.3%



*OptiCentric MOT with OptiSpheric module (Trioptics)*

## High accuracy goniometer

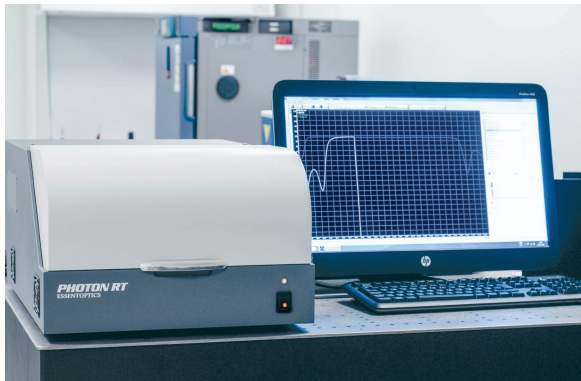
- For testing prisms, polygons, wedges, deflection, roof-angle and refraction index
- Absolute testing of polygons according to the rosette method
- Evaluation of the measurement results in conformance to the ISO 10110-1, VDI-2605 as well as the DIN 3140 standards
- Air bearing rotary table. Accuracy better than 0.6 arcsec
- Minimum specimen surface (uncoated glass) - 0.5 mm<sup>2</sup>
- Maximum specimen diameter - 210 mm



*Goniomat A-HR (Moeller-Wedel Optical GmbH)*

## Spectrophotometer Photon RT

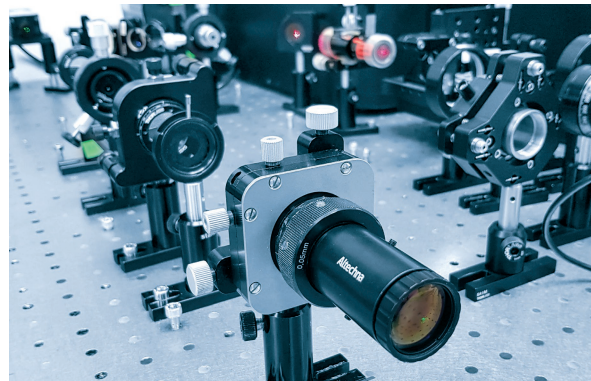
- Designed for measurement of optical samples
- Spectral range is from 190-4900 nm
- Polarization measurements within 220-4900 nm
- Transmittance: T, Ts, Tp for angles 0-75°
- Absolute reflectance: R, Rs, Rp for angles 8-75°
- Option for measurement of polarizing beam splitter cubes (Rs+Tp)



*Spectrophotometer Photon RT (EssentOptics)*

## Custom measurement setups with CW lasers

- According to customer inquiries, we build customized setups to test certain parameters such as: retardation, extinction level, beam displacement, polarizers contrast, pointing stability, transmitted beam distortion, etc.
- Lasers wavelengths: 532 nm, 632.8 nm, 800 nm, 1030 nm, 1064 nm, 1531 nm and 1555 nm



*Custom measurement setups with CW lasers*

## Surface quality inspection

- Visual inspection methods according to MIL-PRF-13830B, ISO 10110-7, ISO 14997:2011 or other strict requirement according to customer
- Equipment for visual inspection workplace:
  - Stereo Nikon microscopes SZX7- 0,75x-100x
  - High power light source (MLC-150C, Motic)
  - Standard illumination – 120 000 Lx
  - Horizontal laminar flow cabinet
- Other equipment:
  - Analytical microscope BX51TRF, 5x-100x (Olympus) with CCD camera for photos and dimension measurement
  - ISO 10110-7 / ISO 14997 Plus - Surface scratch & dig evaluation targets
  - Certified abrasion and adhesion test kit (CAT.S12900)



*Visual Inspection Workplace*

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