Rtec instruments

3D Universal Optical Microscopes

Profilometer Series

Surface Roughness, Step Height, 3D Topography
Cracks, Defects, Slope Measurement,
Film Thickness, Sub Surface Feature

ACCREDITED
MSC®-132
Certified ISO 9001:2015

Impressive and Quick 3D Surface Profilometer

5 Imaging Modes in 1 Microscope

Interferometry, Confocal, Dark Field, Bright Field, Variable Focus

The UP Series provides non-contact surface measurements from nano to micro and combines five imaging modes in one head to characterize all types of surfaces. One click causes the profilometer to switch between the different imaging modes automatically.

Fast Scanning Speed

High pixel colored images

The profiler comes with the latest generation cameras that allow high-speed scanning of the surface. Our camera speed enables coverage of large areas and rapid stitching.

Fully Automatic

Automatic reporting, no need to be an expert

The sample surface is scanned with one click of a button, and an automatic test report in standard format is created with ease.

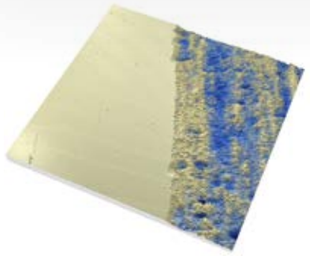
User-Friendly Platform

A cost-effective solution for your industry

The unique platform design comes with high-resolution encoders and open platform architecture. In addition, the cross-roller XY stage ensures high-precision measurements.

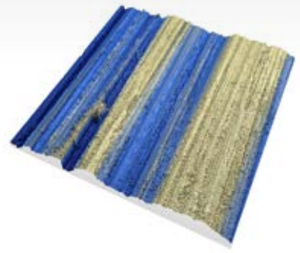
3D Profilometry Without Compromise For All Applications

Precise surface analysis in industry and research is essential to ensure optimal performance of materials and components



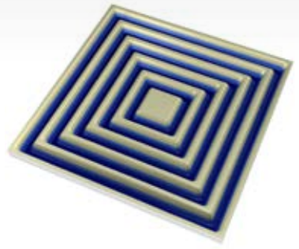
Transparent Materials

- Glasses
- Wafers
- Contact lenses
- Optics elements



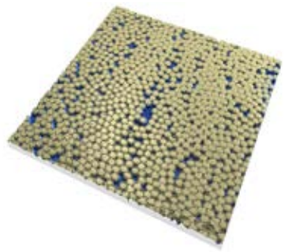
Smooth and Rough Coatings

- Hard coatings
- Roughness
- Scratch analysis
- Porosity



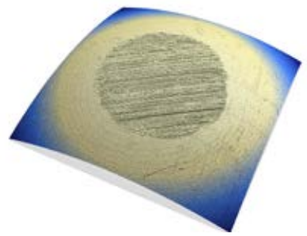
Dark and Shiny Surfaces

- Mirror surface
- 3D waviness
- Step height
- Crack analysis



2D Materials

- Film Thickness
- Grain size
- Defects
- Microstructure



Flat and Non-flat Surfaces

- Tooling
- Additive manufacturing
- Topography
- Volumes

Bright. Dark. 3D

Universal Profilometer Unlike Any Other

Bright Field

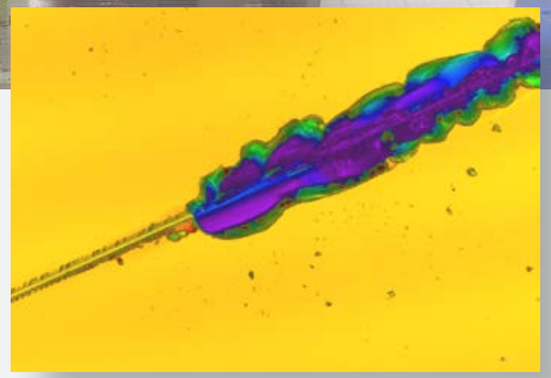
High speed and resolution

Dark Field

Magnifies cracks and defects

5 Imaging Modes in 1 Microscope

3D Optical Surface Metrology



1. **White Light Interferometer (WLI)**
   Highest Z resolution. A big plus for flat, nm height measurements.

2. **Confocal Microscopy Mode**
   Highest lateral resolution. A big plus for transparent, translucent, steep slopes, multi-layer, or rough samples

3. **Bright Field Mode**
   Colored 2D images at high speed

4. **Dark Field Mode**
   Highest contrast imaging. Detects cracks, defects, and failures with high resolutions not possible with any optical technique.

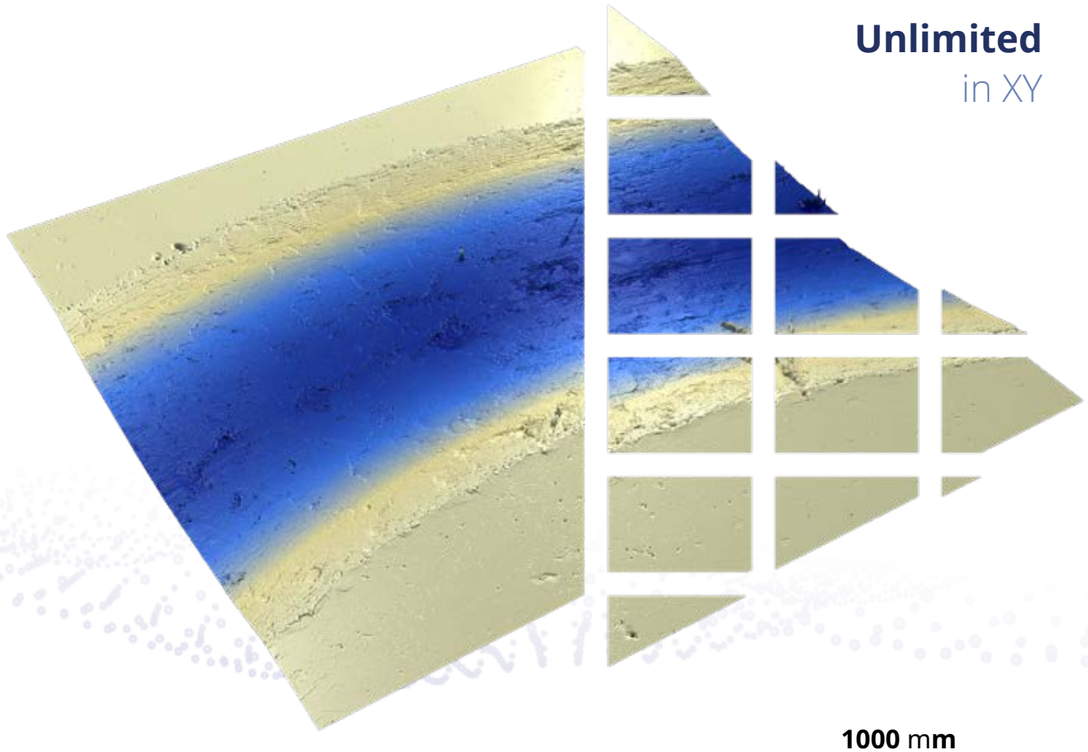
5. **Focus Variation**
   Measures the shape and creates unifocus images of large areas at rapid speed.

Automatic Image Stitching

The UP Series acquires a real color image without any sample movement.

Our software package includes automatic image stitching, ensuring the acquisition of bigger images.

This mode offers the automated imaging of large surfaces at high magnifications.



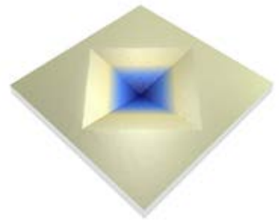
Unlimited
in XY

Available in
All 5 Modes

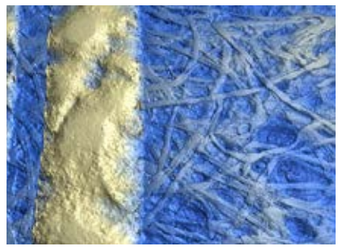
3D Microscope For Multiple Applications

The Most Powerful Package of Analysis On The Market

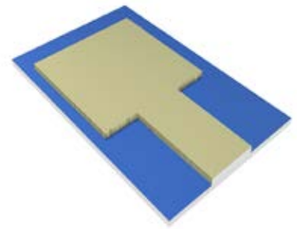
Coin



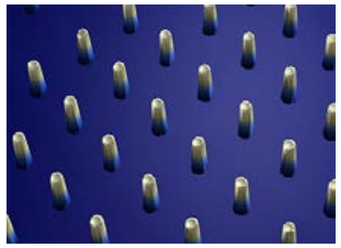
Vickers Hardness



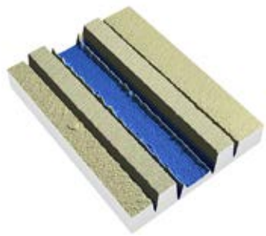
Ink on paper



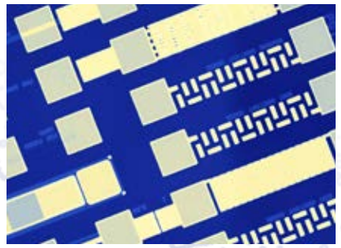
Z calibration sample



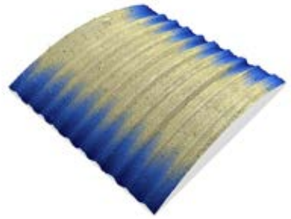
Wafer bumps



Micro fluid chip



Via and Features on Wafer



Turning surface

Confocal

Fastest area scanning confocal technique in the market

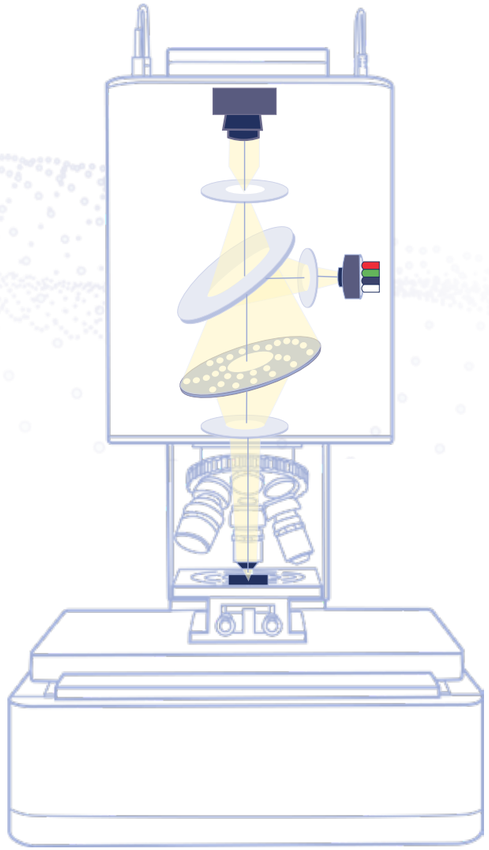
Nipkow Confocal Microscopy (Lambda Head) represents the best confocal technique.

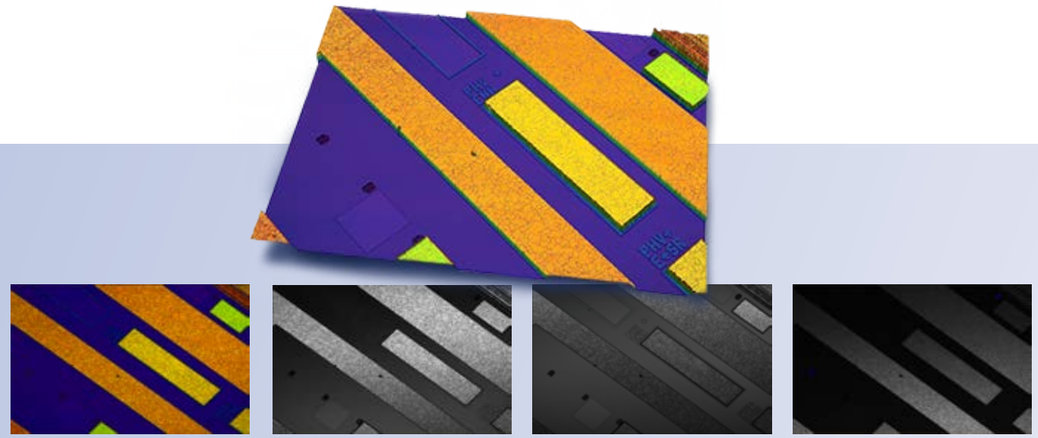
Rather than a single pinhole, the Lambda head has a thousand pinholes arranged on an opaque disk. These several simultaneously present pinholes that scan the sample, allowing high-speed 3D image creation with nm resolution.

Our Lambda Confocal head offers the best speed and resolution of any other confocal technique, such as point confocal to scan the surface using the XY stage, scanning XY mirrors to move the pinhole, or using the pseudo digital confocal method.

Key Features:

- Our Confocal technique uses the highest NA objectives and optically produces the highest lateral resolution.
- Confocal microscopy can retrieve data from steep slopes, 72° vs. 44°, from interferometry.
- No limitation on surface roughness and surface reflectivity
- Colored images
- Find features on tough samples or transparent samples very easily.





Interferometry

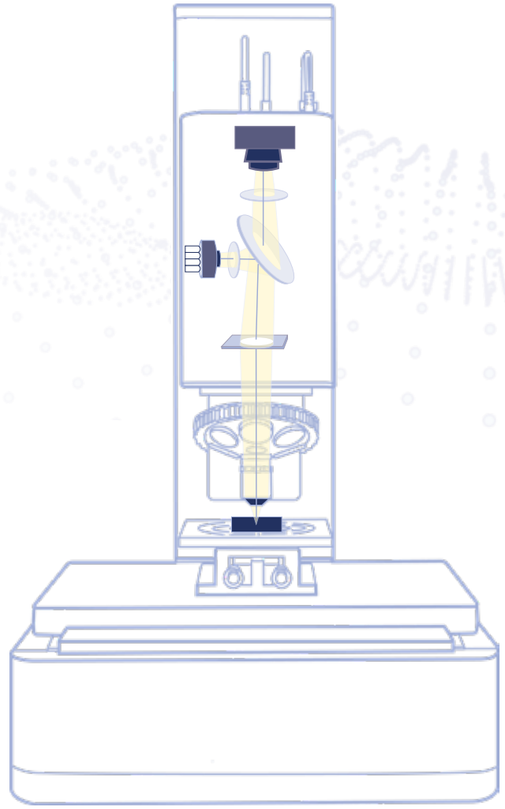
Highest Z Resolution In Non-Contact Profilometry

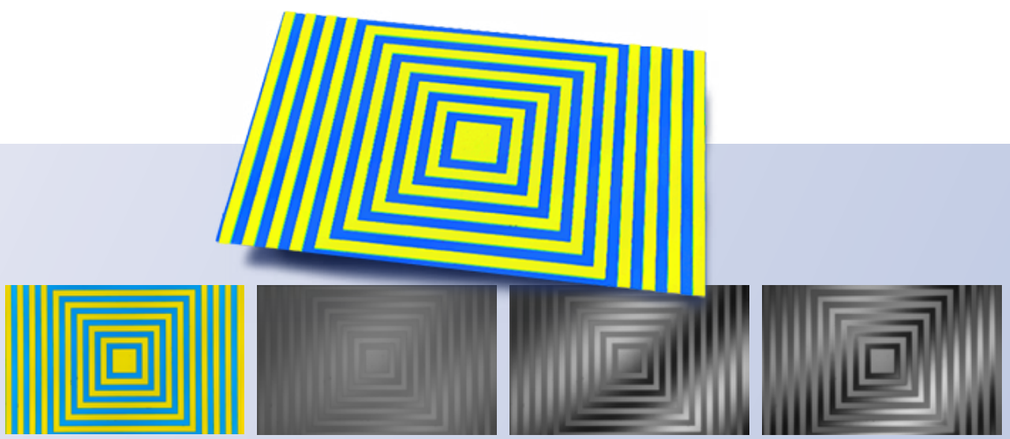
White light interferometry (WLI) is an optical surface topography measurement technique that uses scanning interferometry to generate 2D and 3D models of surface height.

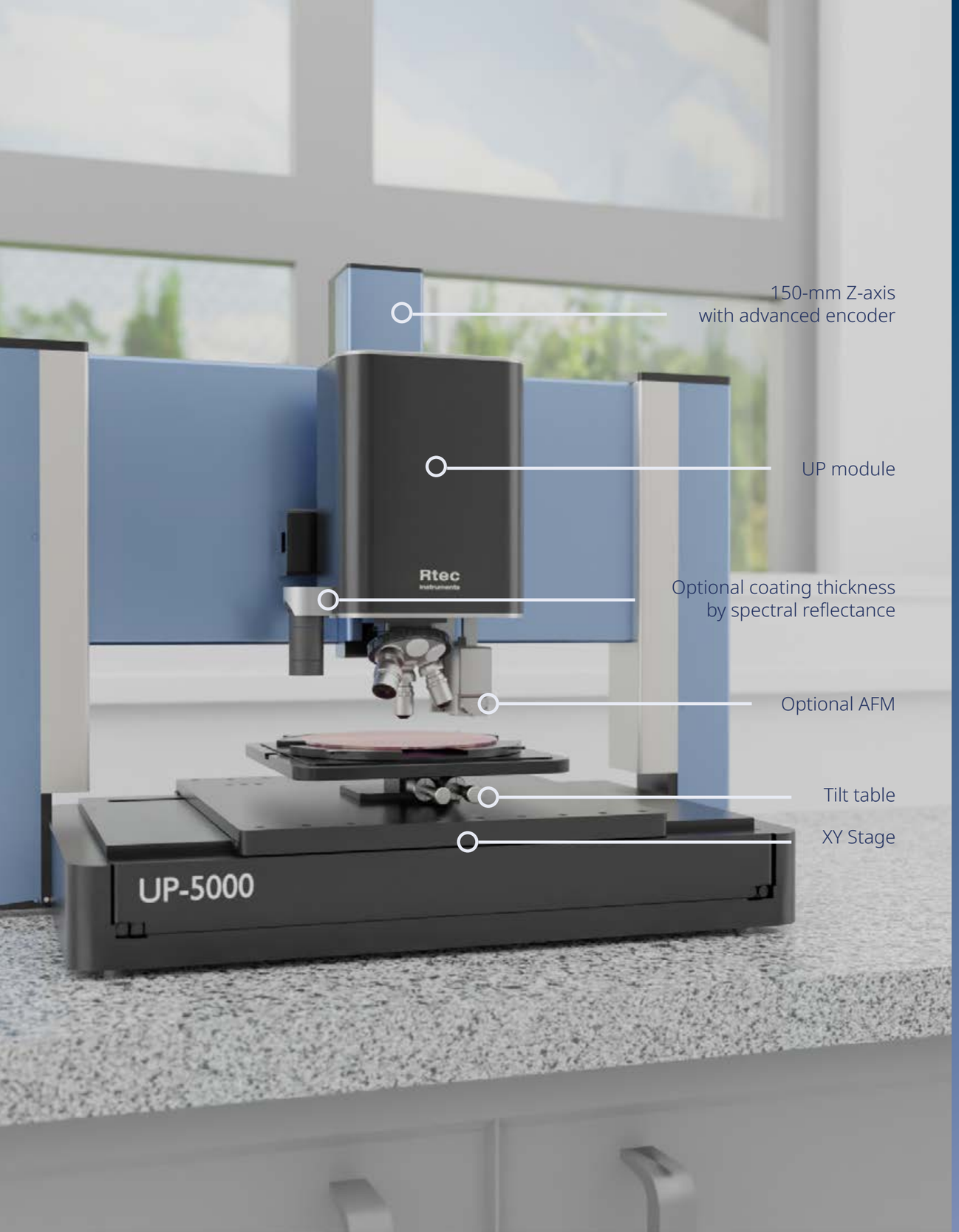
Light reflects from the reference mirror, and the sample is recombined at the beam splitter to create interferograms.

Key Features:

- One of the fastest cameras (250 FPS+) used for WLI in the market
- Highest Z resolution, sub-nanometer
- Z resolution independent of magnification
- User-selectable four-color LED light source (white, red-630nm, green-530nm, and blue-460nm) improves lateral resolution and optical coherence length (blue light provides higher lateral resolution)







Platforms

Profilometer Series

	UP-5000	UP-3000	UP-2000
Bright and Dark Field	✓	✓	
Spinning Disk Confocal	✓	✓	
White Light Interferometry	✓	✓	✓
Variable Focus Imaging	✓	✓	
3D Image Stitching	✓	✓	✓
Spectral Reflectance Profilometry	✓		
AFM	✓		
Raman Microscope	✓		
XYZ Stage*	300 x 300 x 150 mm	150 x 200 x 150 mm	150 x 200 x 150 mm

* More custom options are available

3D Profilometry for Inspection of Surfaces

Colored Images

Measuring the 3D surface topography has become increasingly important in industrial automation, particularly in in-situ product inspection.

Our 3D optical profilers provide many benefits over other measurement methods used for non-contact inspection. These benefits range from rapid measurement speeds and custom analysis to completely automated measurements and non-destructive inspection.

Software

A complete software package is provided with all UP Series instruments.

Imaging analysis

- Roughness
- 3D imaging
- Volume of wear or holes
- Step height
- Additional Features

Analysis Package and International Standards

The UP modules series has several test-specific data traceability standards and quick platform checkups. The instruments also come with standard test recipes to ensure normalized testing.

- Real-time imaging of 3D surface topography.
- Overlay color and intensity images on 3D topography.
- Data acquisition artifact processing - outliers, local defects.
- Roughness and surface texture - with the latest ISO and national standards.
- Extraction and analysis regions of interest (Page viewer for fast navigation.)
- Modules for advanced surface texture analysis, contour analysis, grains, and particles analysis, 3D Fourier analysis, image co-localization, statistics, and more.
- Fast, automated, traceable surface analysis report creation
- Pass/fail criteria with green/red traffic lights can be specified for any parameter.
- Series of measurements can be analyzed automatically using templates and mini-docs (common sequences of analysis steps).
- Comprehensive data export: PDF, RTF, screen and print quality bitmaps, Excel compatible numerical results for compatibility with quality management and other systems.
- Integrates with Mountains Map software.

The UP instruments comply with many different testing standards ISO 25178, EUR15178, ISO 16610, and ISO 4287.

Specifications

Interferometry Objectives

	2.5X	5X	10X	20X	50X	100X
Numerical Aperture (NA)	0.075	0.13	0.3	0.4	0.55	0.7
Working Distance (mm)	10.3	9.3	7.4	4.7	3.4	2.0
FOV (um)	6910 x 5180	3460 x 2590	1730 x 1300	860 x 650	350 x 260	170 x 130
Optical Resolution (L&S 460 nm) (um)	1.87	1.08	0.47	0.35	0.26	0.20
Vertical Resolution	Better than 0.01nm					
Vertical RMS repeatability RMS	0.01nm					

Confocal, Bright Field, and Dark Field Objectives

	Standard Working Distance						Long Working Distance		
	5X	10X	20X	50X	100X	150X	20X	50X	100X
Numerical Aperture (NA)	0.15	0.3	0.45	0.8	0.9	0.95	0.4	0.6	0.8
Working Distance (mm)	23.5	17.5	4.5	1.0	1.0	0.3	19	11	4.5
Field of view (um)	3460 x 2590	1730 x 1300	860 x 650	350 x 260	170 x 130	120 x 90	860 x 650	350 x 260	170 x 130
Optical Resolution (L&S 460nm)(um)**	0.94	0.47	0.31	0.18	0.16	0.15	0.35	0.23	0.18
Vertical Resolution (nm)	72.0	18.0	8.0	2.5	2.0	1.8	10.1	4.5	2.5

Rtec-Instruments Inc
USA
1810 Oakland Road, Ste B
San Jose, CA, 95131, USA
✆ +1 408 708 9226
info@rtec-instruments.com

Rtec-Instruments SA
EMEA
Chemin des Taborneires 4 (Box 115)
1350 Orbe (Switzerland)
✆ +41 24 552 02 60
info.eu@rtec-instruments.com

Rtec-Instruments, CN
China
8th Floor, Building A, Juntai International, No. 300
Xicheng Rd, Jianye District, Nanjing, China 210019
✆ +86 025 83210072
info@rtec-instruments.cn

Rtec-Instruments, JP
Japan
Tokatsu Techno Plaza, Rm 409
5-4-6 Kashiwanoha, Kashiwa-shi, Chiba, Japan, 227-0882
✆ +81-50-5896-9916
info.jp@rtec-instruments.com

▲ **Rtec-Instruments Office**
● **Agent / distributor**

www.rtec-instruments.com

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