

The μm Precise Inspection Machine for
Cutting Edge Preparation and Surface Finish

ZOLLER
expect great measures

μm Focus



Focused on Perfection

You want to produce the perfect cutting edge – one that ensures a long tool life, minimal wear, optimal chip formation, and precision workpiece processing, thereby significantly lowering costs for production.

Achieve your goals with high-precision tool geometry and optimal surface textures customized to your specific application. If you want to ensure exact, standardized quality in your tool development, then the ZOLLER » μ Focus« inspection machine is the right choice for your needs.

» μ Focus« uses non-contact measurement procedures to determine the surface roughness and cutting edge preparation of your tool, down to the μm . Use the ZOLLER » μ Focus« to create fully optimized tools.

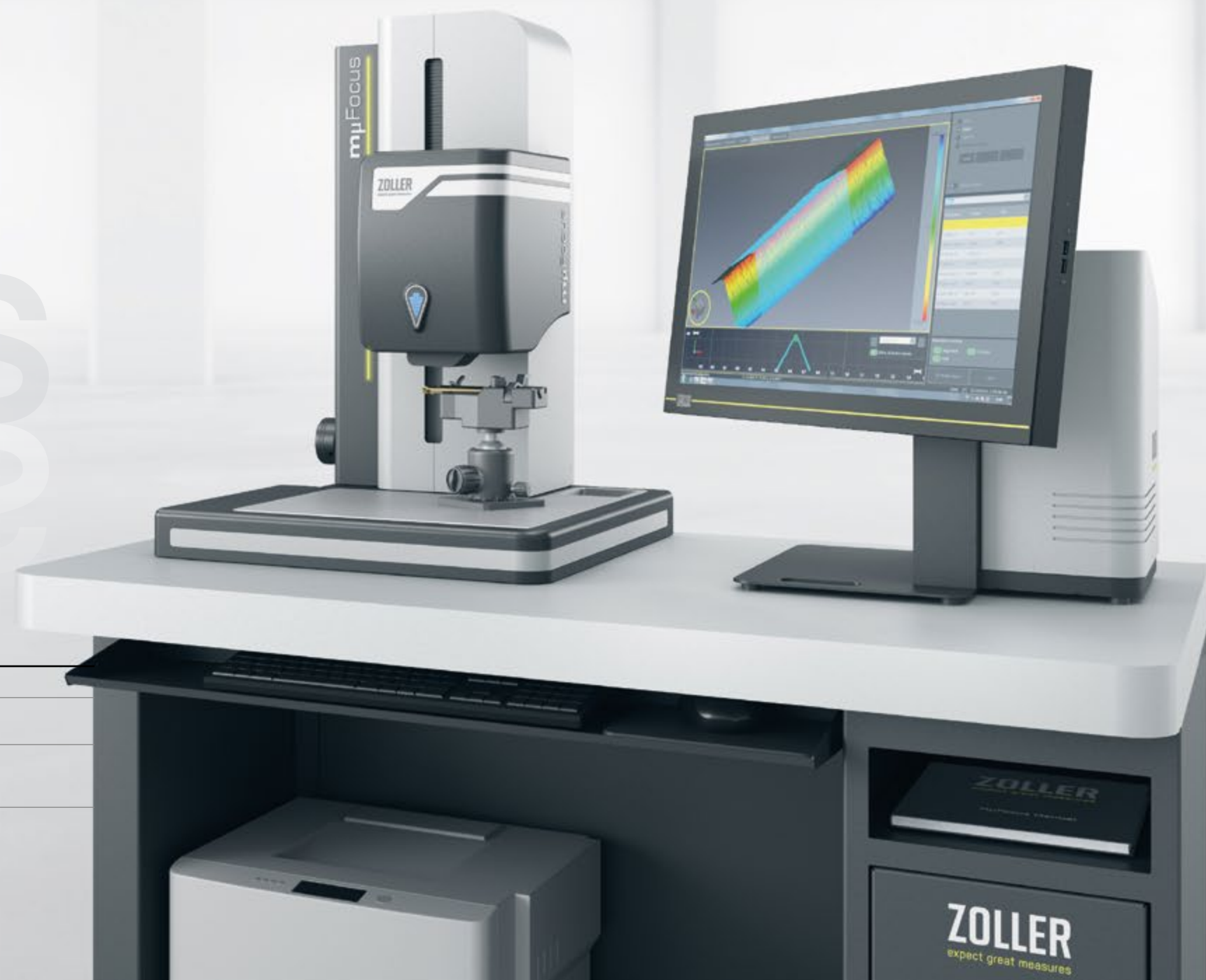
» μ Focus«





Solid Values

Whether you use the ZOLLER »µFocus« in your inspection room or production environment, your results will not be affected. You will always receive the highly precise measured values you need. Its robust design helps the machine guarantee outstanding measuring technology performance even if placed between the tool shelves and CNC machines.

With ZOLLER, you can always rely on measurements that are precise down to the μm . »µFocus« goes a step further. When analyzing surface roughness, it can measure with precision surpassing the μm threshold and achieve a measuring accuracy of $0.1 \mu\text{m}$. Thanks to the easy to use software and unique ergonomics, you can take advantage of this outstanding precision again and again.



»µFocus« Overview

	Z axis	AA*	Measuring principle	Smallest measurable radius	Numerical aperture
»zep« sensor to measure cutting edge geometry	 300 mm / 11.8 inches	30 mm / 1.18 inches	Stripe projection	3 μm	-
»zep-R« sensor for measuring 3D cutting edge geometry and surface roughness	 300 mm / 11.8 inches	20 mm / .79 inches	Confocal microscope	3 μm^{**}	0.42 mm / .02 inches

* AA describes the smallest distance between the lens and the measured object.

** Values for 20x lens; values for 50x lens: $1.4 \mu\text{m}$.

We reserve the right to make technical changes. The depicted machines may include options, accessories, and control variants.



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Markus Müllner, Assembly Measuring Systems at ZOLLER

Proud of »μFocus«

“For me, to assemble a »μFocus« is something unique and special every single time. This machine is based on the synergy between two seemingly opposing but complementary characteristics: A robust footprint and weight of 440 pounds that also incorporates very delicate and precise measuring technology. This combination enables us to deliver a solution that can measure right down to the micrometer.

I install top-quality sensors and many other elements using modern technology into »μFocus« machines. I am very proud that assembling the »μFocus« is one of my duties. I can guarantee you one thing: The »μFocus« is a high performance machine that you can use to easily measure cutting edges and surfaces with outstanding precision.”

Turn the Extraordinary into a Matter of Habit

All of the functional and design elements, and all of the work processes performed by a ZOLLER » μ Focus« have been carefully shaped and selected. The results are clear for anyone developing cutting tools: Never before has it been so easy to achieve an outstanding inspection of cutting edge preparation and surface roughness, precise down to the μm .

Quick Manual Adjustment

Pre-positioning is fast, easy and convenient with quick adjustments. Upon request, » μ Focus« can even set the correct sensor position fully automatically using the optional CNC axis.

Measurement Sensor Variants

The blue symbol designates the machine version with the »zep« Edge Preparation Sensor. Use this version to measure cutting edge preparation quickly with high-precision accuracy.

The yellow symbol stands for the optional confocal microscope with the »zep-R« Edge Preparation Roughness Sensor. This sensor also analyzes surface roughness.

Multiple Tool Holders Available

You can use » μ Focus« for a wide range of different tools with the many optional tool holders available.

Manual Fine Adjustment of the Z Axis

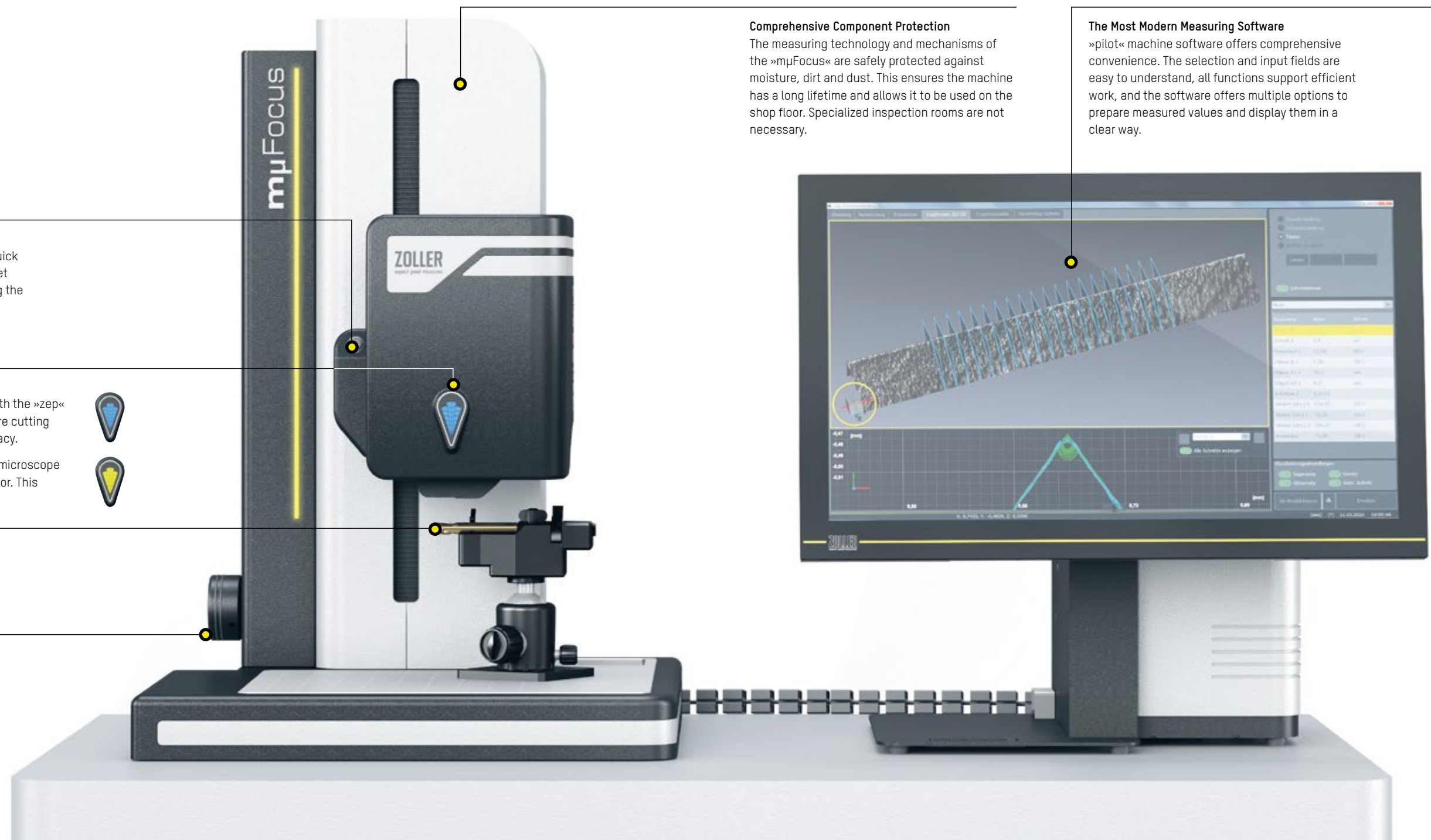
After pre-positioning use the hand wheel for fine adjustment to desired plane.

Comprehensive Component Protection

The measuring technology and mechanisms of the » μ Focus« are safely protected against moisture, dirt and dust. This ensures the machine has a long lifetime and allows it to be used on the shop floor. Specialized inspection rooms are not necessary.

The Most Modern Measuring Software

»pilot« machine software offers comprehensive convenience. The selection and input fields are easy to understand, all functions support efficient work, and the software offers multiple options to prepare measured values and display them in a clear way.



A Matter of Position

To fully utilize the potential of the »µFocus« software, you should confidently hold your tools and bring them to exactly the right position. ZOLLER offers optimal tool holders and accessories to help you perfectly position your tools for any measurement.

Universal Holding Fixture

V-Block and Clamp for Shanks
D14 to D32.

Adjustable Tool Stops

V-Block and Clamp for Shanks
D3 to D12.

Integrated spring loaded
manual clamping pin for
inserts and parts
The protective sleeve pre-
vents microscopic damage
to the cutting edge.



Ball Joint Clamping Grip

Base



Manual Spindle

The spindle clamps tools using collets. The tool can be turned to any desired position for measurements.



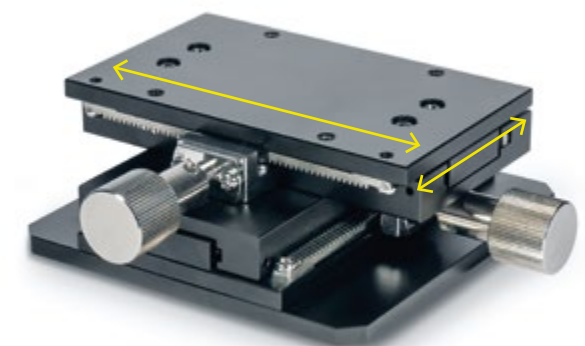
Insert Base

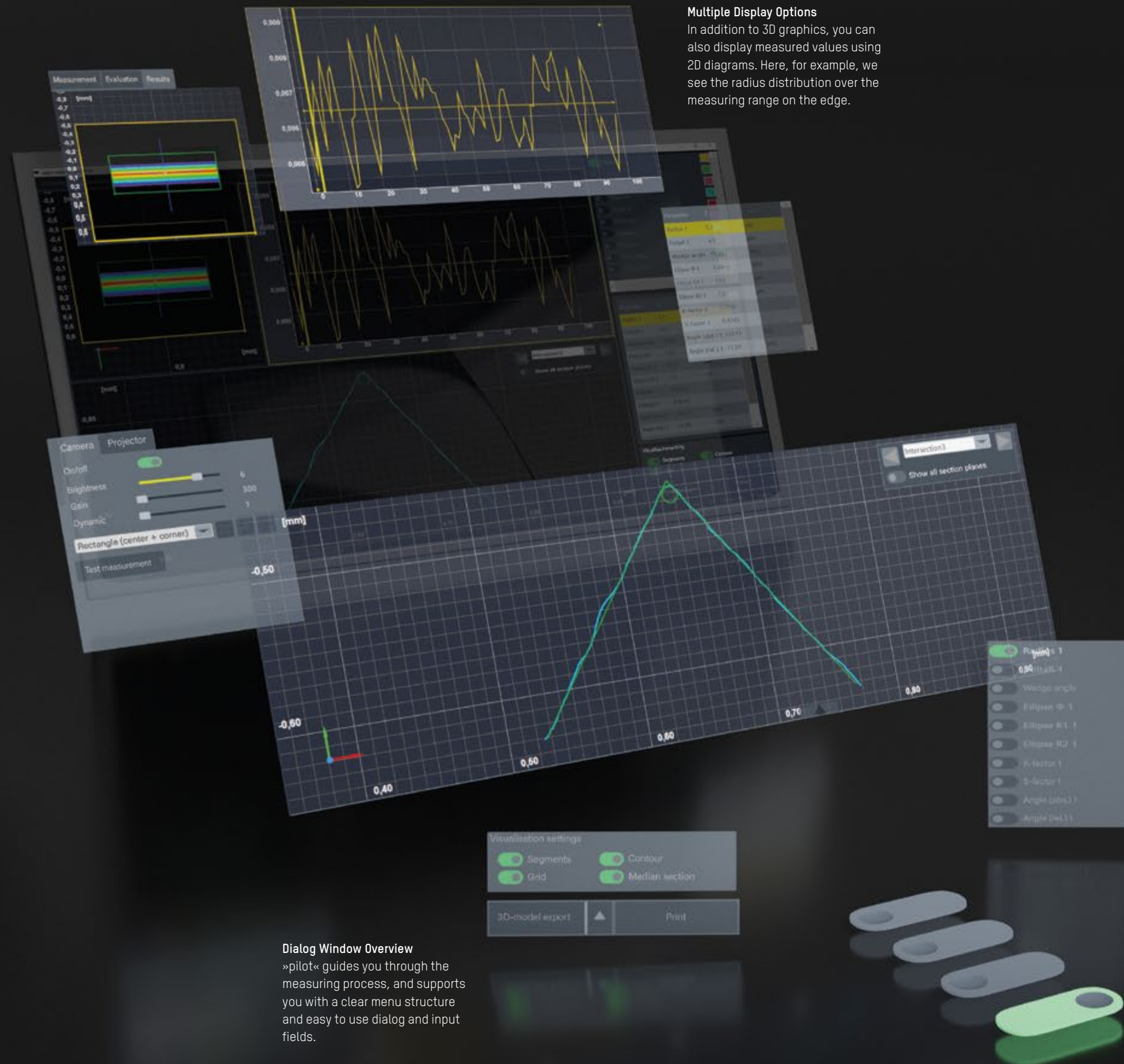
The insert base for cutting inserts can be tilted precisely in two axes to any position using two adjustment screws. This allows you to exactly position the inserts for measurement with »µFocus«.



X-Y Positioning Table

The optional positioning table can be used in conjunction with any of the holding solutions above.





Multiple Display Options

In addition to 3D graphics, you can also display measured values using 2D diagrams. Here, for example, we see the radius distribution over the measuring range on the edge.

Dialog Window Overview

»pilot« guides you through the measuring process, and supports you with a clear menu structure and easy to use dialog and input fields.

Programmed for Efficiency

ZOLLER »pilot« measuring machine software is installed on all ZOLLER measuring machines – including »mpFocus«. It ensures you receive precise measuring results and good repeatability in all measuring technology tasks, regardless of the operator. Operating the measuring machine and evaluation of measurements is very easy.

Thanks to the flexible design of the software, ZOLLER can react even more quickly and efficiently to individual customer requirements for measuring tasks, analyses and evaluations.

Comprehensive Analysis Options

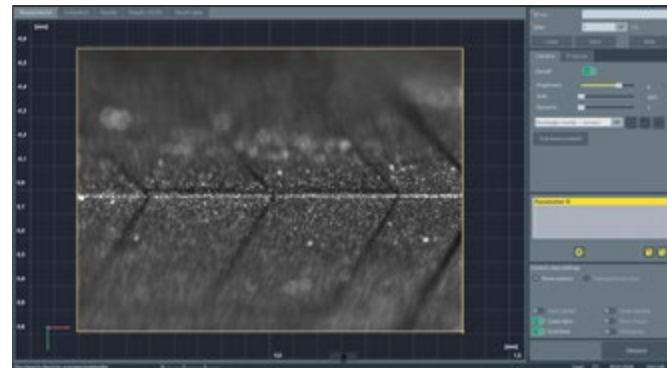
After completing a measurement »pilot« allows you to easily select the parameters you want to evaluate.

»pilot«

Leads You to the Finest Quality

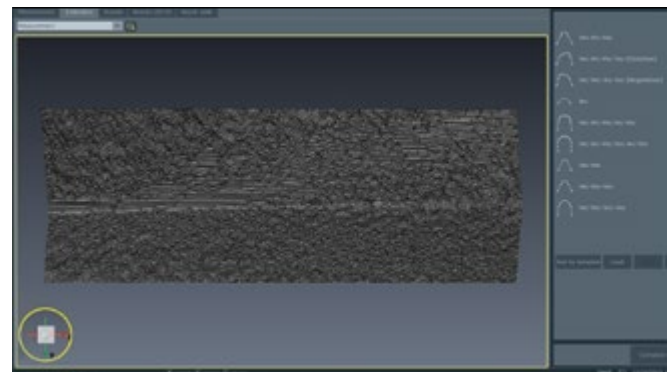
ZOLLER » μ Focus« systematically deals with microstructures. Clear processes and supporting tools provide detailed insight of cutting tool edges and surfaces. You can detect wear quickly, create a 3D model with just one click, and easily measure cutting edge preparation and roughness.

» μ Focus« takes multiple individual images to record comprehensive raw data, then uses it to calculate a 3D model of the cutting edge. Then you can complete a standardized analysis of the measuring results and prepare them graphically using »pilot«.



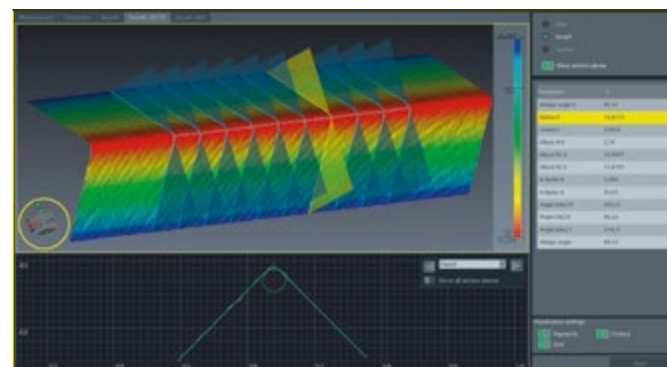
1. Easy to Focus

After you have clamped and positioned the tool, focus on the cutting edge. The monitor screen, adjustable lighting and software make focusing easy. Then you can select the measurement area and the parameters to be determined with a mouse click and start the measurement.



2. Individual Analysis

During the measurement, » μ Focus« scans the cutting edge and calculates a 3D model using DIN conform algorithms. You select the cutting edge geometry, and define how the software should analyze measuring results. You can specify, for example, how many sections should be created through the cutting edge. The more sections, the more precise your analysis will be.



3. Versatile Displays

After completing the analysis, you can display measuring results topographically, in greyscale, as measurement curves, or in a table in accordance with DIN. The calculated 3D model can be colored, moved, turned and zoomed in any direction after visual inspection.

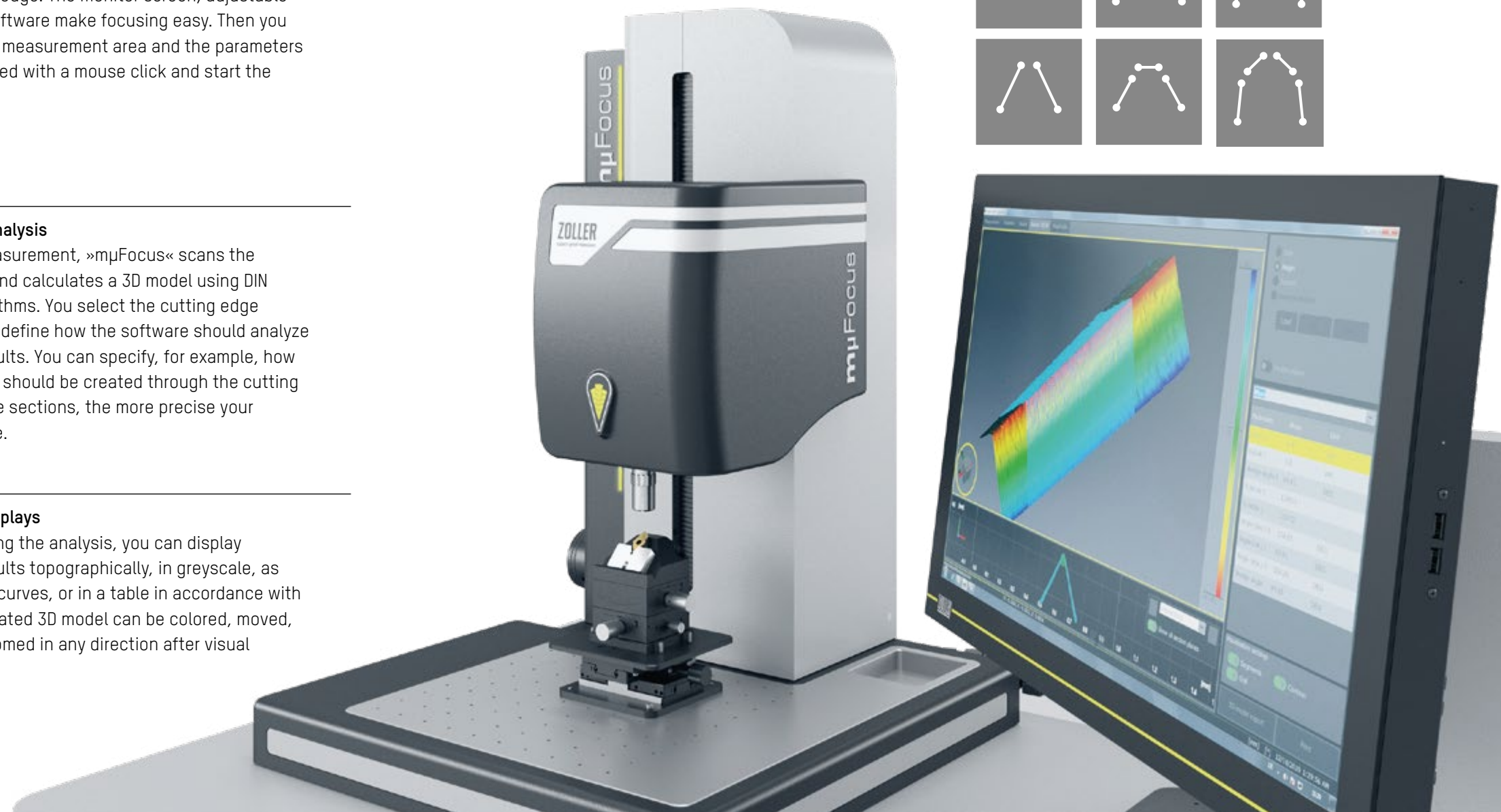
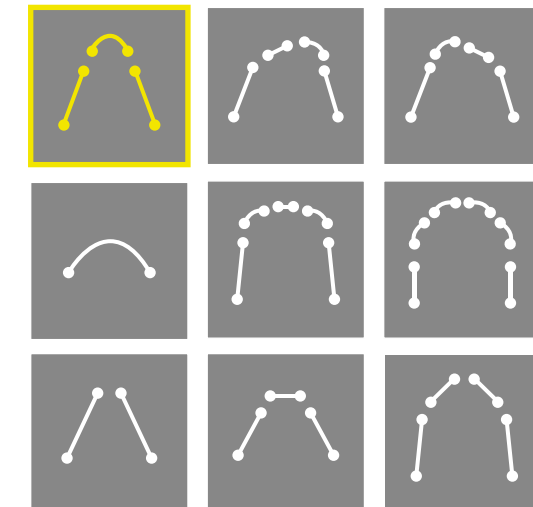
Ready for Different Geometry Types

If desired you can choose from an array of predefined geometrical analysis tools. Just click, start the analysis, and display your results.

With » μ Focus«, you gain an easy advantage in developing tool innovations.

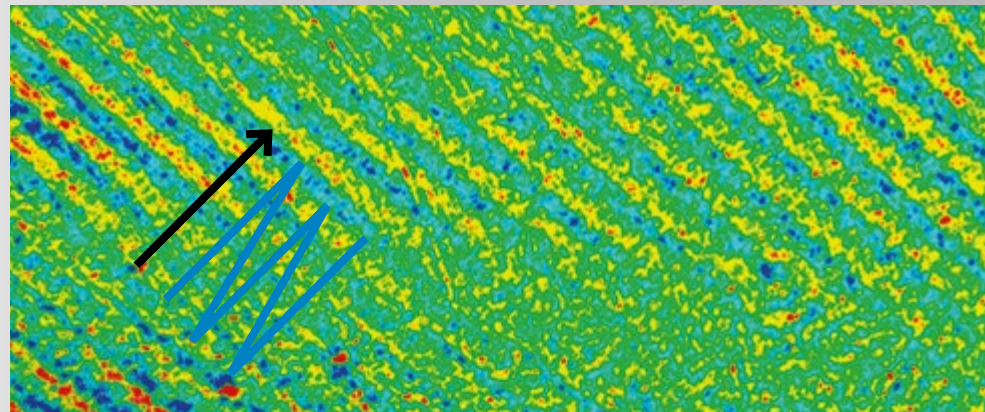
Fast Selection, Fast Analysis

Large, clear symbols make it easy to make your selection. The cutting edge form Vec-Arc-Vec (line, arc, line) was selected in the example.



ISO Conforming for All Measured Variables

With ZOLLER, you can complete measurements in accordance with international standards such as ISO 4287 and ISO 13565. All measurements and analyses you complete with ZOLLER »µFocus« are not only precise, but also standardized and comparable. You receive a broad range of measured variables you can use to describe and visualize cutting tool edges and surfaces.



Display of grooves in a tool surface. Yellow points indicate elevated areas, while blue indicate recesses. The blue line marks the measurement path, while the arrow shows roughness orthogonal to the grooves.

How a ZOLLER »µFocus« Analyzes Cutting Tool Edge Data

Surface Roughness:

The CCD camera records the surface structure of the measured area. The software then filters out disturbances from the data on the scanned surface, so that you can complete all analyses.

The analysis includes a color-coded height profile. Red points are closest to the »zep-R« sensor, while blue points are farthest away. The data is used to create a histogram. The histogram shows the distribution of the heights on the measured surface, and serves as the basis for all analyses.

Profile Roughness:

Height differences in the surface, their shape and their frequency must be detected to describe profile roughness. To do so, the software checks how these differences are distributed across the surface.

The image above clearly shows that the height difference on the tool surface creates a pattern of green surfaces and parallel yellow and blue lines. Yellow and red areas indicate elevated areas, while blue are recesses. The pattern shows the course of the grooves. Profile roughness is calculated perpendicular to the grooves (black arrow).

As in tactile measurement, the required minimum length is measured. The pixels are stitched together along the zig-zag shaped minimum distance in this small area.

Profile Roughness: Measurable Parameters in Accordance with ISO 4287 and ISO 13565

- Ra: arithmetic mean deviation of the assessed profile
- Rq: root mean square deviation of the assessed profile
- Rt: total height of the roughness profile
- Rmax: maximum height of the roughness profile within an individual measured distance
- Rz: mean height of the roughness profile
- Rp: maximum profile peak height
- Rv: maximum profile valley depth
- Rk: core roughness depth
- Rpk: reduced peak height
- Rvk: reduced valley depth
- Mr1: material ratio 1 (Abbot curve)
- Mr2: material ratio 2 (Abbott curve)
- Rsm: mean groove width
- R_{PC}: peak count number

Surface Roughness: Measurable Parameters in Accordance with ISO 25178-2 and ISO 16610

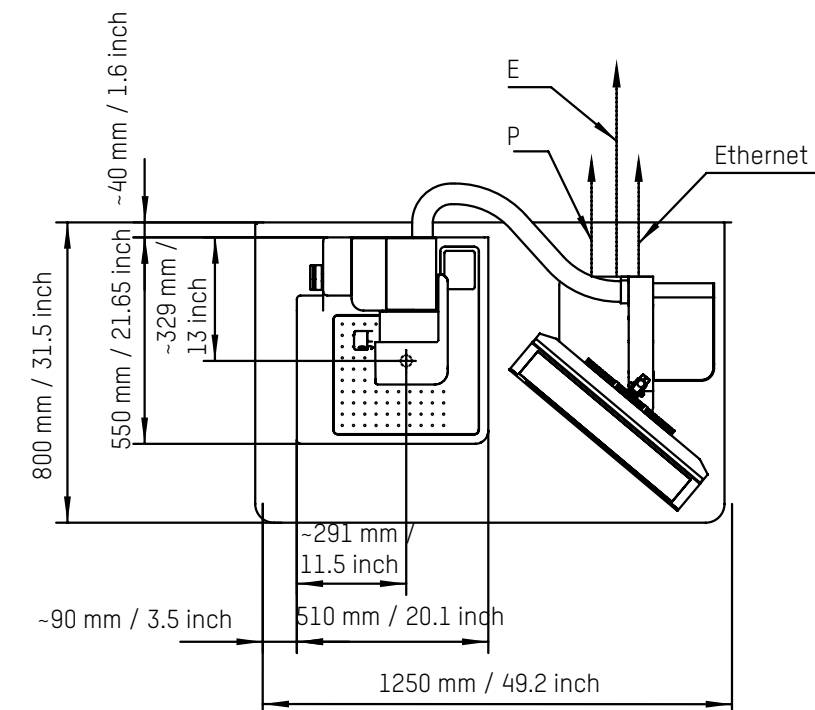
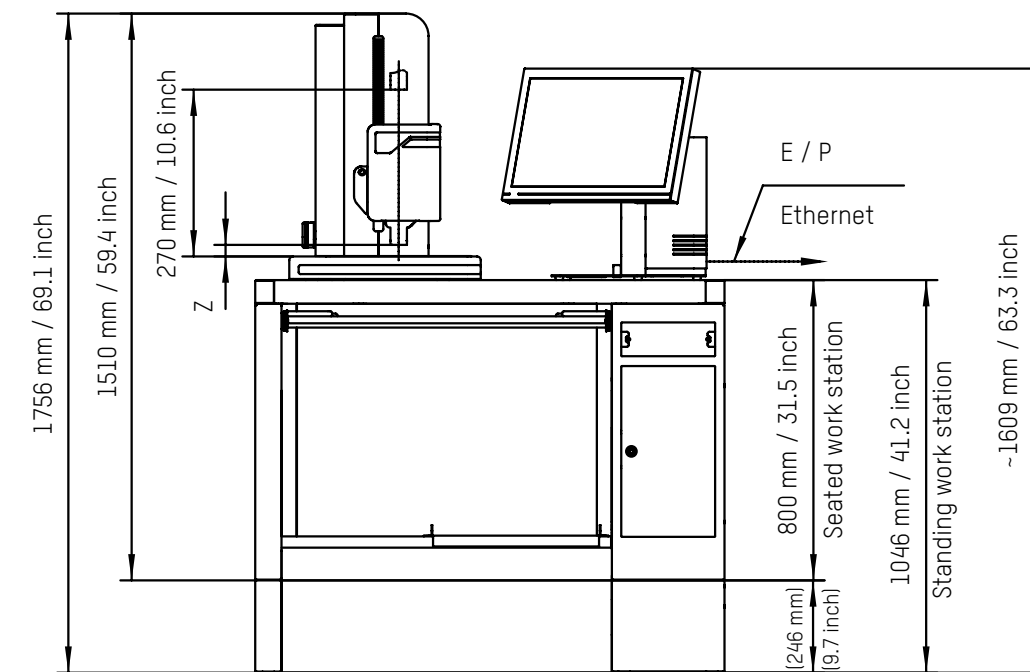
- Sa: mean arithmetic height
- Sq: root mean square height
- Sp: maximum peak height
- Sv: maximum valley height
- Sz: maximum height
- S_{10z}: ten-point height of the surface
- Ssk: skewness
- Sku: kurtosis
- Sdq: root mean square gradient
- Sdr: developed interfacial area ratio
- FLT: flatness
- Sk: core height
- Spk: reduced peak height
- Svk: reduced valley depth
- Smr1: peak material portion
- Smr2: valley material portion
- Vmc: core material volume
- Vmp: peak material volume
- Vvc: core void volume
- Vvv: dale void volume
- Sxp: peak extreme height
- Str: texture aspect ratio

Compact and Ergonomic

» μ Focus« is a machine offering compact dimensions and excellent ergonomics. Depending on the table design, it is optimized for seated or standing operation.



Two table options: Depending on which table you select, you can operate » μ Focus« at a seated or standing work station. When equipped with a »zep« sensor, » μ Focus« is also available as a simple table top machine (without a table system).



Note: P: Air connection E: Electrical connection

Installation weights

Measuring machine	Weight
» μ Focus« with »zep« sensor and table system	250 kg / 551.2 lbs
» μ Focus« with »zep-R« sensor and table system	270 kg / 595.2 lbs
» μ Focus« with »zep« sensor, without table system	75 kg / 165.3 lbs

At home in Germany – around the world for you

- Parent company
- Headquarters
- Branch office
- Representative

ZOLLER quality is “Made in Germany” – and there for you, everywhere in the world.

Our company has a global presence with 85 locations made up of our own branches and representatives network. This guarantees you receive first-class, personalized customer service in every corner of the world.

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ZOLLER Solutions

More speed, higher quality, safer processes – with ZOLLER you can get more out of your production.

We combine hardware, software and services to give you optimum system solutions for presetting, measuring, inspection and managing machining your cutting tools.

Presetting & Measuring

Tool Management

Inspection & Measuring

Automation

Everything from a single supplier.
Everything for your success.
Everything with ZOLLER solutions.

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ZOLLER
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