

# EDGEMASTERX

How to measure multiple edges in only one measurement run

## THE SYSTEM

### Automated cutting edge measurement

The EdgeMasterX is a fully automated cutting edge measurement device for production integrated quality assurance of inserts, drills, mills and other round tools. Specifically, the EdgeMasterX enables automated multi-edge measurement of tools. In a single measurement run, a complete series of user defined measurements at multiple edge positions can be achieved. The system is designed to implement fully automated quality assurance into the production process. All results are traceable, repeatable, and in high vertical resolution.

## THE BENEFITS

### Automatic measurement of multiple edges

Users can measure defined edge parameters on various tool positions to verify, for example, cutting edge preparation processes. In addition, form and roughness of a specific position can be analyzed and compared across multiple tools within a batch. When utilized in combination with a motorized rotation unit, users benefit from the measurement of multiple tool edges, even chamfered edges, in one single measurement run. The user interface design is simplistic and user-friendly having a single button solution allowing for measurements to occur without any further user interactions. Upon completion of the scan, deviations from a CAD dataset are easily visible as a traffic light system is used to indicate differences and non-conformities.

## ALICONA TOOL MEASUREMENT SYSTEMS

### High resolution cutting edge measurement systems in production

The EdgeMasterX originates from the Alicona product line for automatic tool measurement and represents an enhancement of the original EdgeMaster. Both systems are designed for production integrated quality assurance and enable traceable and repeatable measurements even when vibrations, changing temperatures and ambient light are incurred. Typically, users measure edge parameters such as radii, angles, chipping, and roughness.



| Item    | Material | Type | Reference Type |
|---------|----------|------|----------------|
| 1 Edge  | AL3D     | G3D  | Standard Edge  |
| 2 Edge  | AL3D     | G3D  | Standard Edge  |
| 3 Edge  | AL3D     | G3D  | Standard Edge  |
| 4 Edge  | AL3D     | G3D  | Standard Edge  |
| 5 Edge  | AL3D     | G3D  | Standard Edge  |
| 6 Edge  | AL3D     | G3D  | Standard Edge  |
| 7 Edge  | AL3D     | G3D  | Standard Edge  |
| 8 Edge  | AL3D     | G3D  | Standard Edge  |
| 9 Edge  | AL3D     | G3D  | Standard Edge  |
| 10 Edge | AL3D     | G3D  | Standard Edge  |



## GENERAL SPECIFICATIONS

|   |  |
|---|--|
| Measurement principle                                     | non-contact, optical, three-dimensional, based on Focus-Variation  |
| Max. number of measurement points in a single measurement | X: 2040, Y: 2040; X x Y: 4.16 million  |
| Max. number of measurement points                         | X: 62500, Y: 62500; X x Y: 500 million   |
| Positioning volume (X x Y x Z)                            | mot.: 50 mm x 50 mm x 155 mm (Z: 25 mm mot., 130 mm man.) = 387500 mm <sup>3</sup>   |
| Ring light illumination                                   | white LED high-power ring light, 24 segments   |
| Positioning help  | coaxial laser beam   |
| Dimensions (W x D x H)                                    | measurement instrument: 195 mm x 316 mm x 418 mm, ControlServerHP: 190 mm x 500 mm x 450 mm  |
| ControlServerHP   | 12 Core, 32 GB, 24" Full HD LED Monitor  |
| Applications  | automated tool measurement in production with automatic multi edge measurement; applied for quality assurance of inserts, mills, drills and other round tools. |

## MEASUREMENT OBJECT

|                 |   |
|-----------------|---|
| Surface texture | surface topography Ra above 0.009 µm with λ <sub>c</sub> 2 µm; depending on surface structure |
| Max. height     | 155 mm (more with respective grip)  |
| Max. weight     | 4 kg; more on request   |
| Diameter        | 0.5 mm - 40 mm (in combination with Real3D Rotation Unit G2)                                  |

## OBJECTIVE SPECIFIC FEATURES

| Objective magnification (*)                 |                 | 10x  | 20x | 50x  | 2xSX | 5xSX | 10xSX | 20xSX | 50xSX |
|---|-----------------|------|-----|------|------|------|-------|-------|-------|
| Working distance                            | mm              | 17.5 | 13  | 10.1 | 34   | 34   | 33.5  | 20    | 13    |
| Lateral measurement range (X, Y)<br>(X x Y) | mm              | 2    | 1   | 0.4  | 10   | 4    | 2     | 1     | 0.4   |
|   | mm <sup>2</sup> | 4    | 1   | 0.16 | 100  | 16   | 4     | 1     | 0.16  |
| Measurement point distance                  | µm              | 1    | 0.5 | 0.2  | 5    | 2    | 1     | 0.5   | 0.2   |
| Measurement noise                           | nm              | 40   | 20  | 10   | 1240 | 180  | 45    | 25    | 15    |
| Vertical resolution                         | nm              | 100  | 50  | 20   | 3500 | 510  | 130   | 70    | 45    |
| Vertical measurement area                   | mm              | 16   | 12  | 9    | 25   | 25   | 25    | 19    | 12    |

(\*) Objectives with higher working distance available upon request

## RESOLUTION AND APPLICATION LIMITS

| Objective magnification        |    | 10x  | 20x   | 50x  | 2xSX | 5xSX | 10xSX | 20xSX | 50xSX |
|--------------------------------|----|------|-------|------|------|------|-------|-------|-------|
| Min. measurable radius         | µm | 5    | 3     | 2    | 20   | 10   | 5     | 3     | 2     |
| Min. measurable wedge angle    | °  | 20   |       |      |      |      |       |       |       |
| Min. measurable roughness (Ra) | µm | 0.3  | 0.15  | 0.08 | n.a. | n.a. | 0.45  | 0.25  | 0.15  |
| Min. measurable roughness (Sa) | µm | 0.15 | 0.075 | 0.05 | n.a. | n.a. | 0.25  | 0.1   | 0.08  |
| Max. bevel length              | µm | 800  | 400   | 160  | 4000 | 2000 | 800   | 400   | 160   |
| Max. measurable slope angle    | °  | 87   |       |      |      |      |       |       |       |

## ACCURACY

|                   |                  |                           |
|-------------------|------------------|---------------------------|
| Profile roughness | Ra = 0.5 µm      | U = 0.04 µm, σ = 0.002 µm |
| Area roughness    | Sa = 0.5 µm      | U = 0.03 µm, σ = 0.002 µm |
| Wedge angle       | β = 70 ° - 110 ° | U = 0.15 °, σ = 0.02 °    |
| Edge radius       | R = 5 µm - 20 µm | U = 1.5 µm, σ = 0.15 µm   |
|                   | R > 20 µm        | U = 2 µm, σ = 0.3 µm      |

## SOFTWARE

|                     |  |
|---------------------|--|
| Measurement modules | Standard: automatic edge measurement (edge radius, form, contour, form deviation), multi edge measurement<br>Optional: chipping, roughness, edge break |
| Automation          | integrated scripting language; LabVIEW framework; .NET remoting interface  |
| Languages           | German, English, French, Korean, Japanese, Chinese   |
| Export formats      | 3D data sets (e.g.: AL3D, STL, G3D, Open GPS, CSV, QDAS), image formats (e.g.: BMP, JPG, PNG)  |
| Import formats      | 3D data sets (e.g. AL3D, STL, G3D), image formats (e.g. BMP, JPG, PNG)   |