



Seeing beyond

How to Choose the Right Surface, Form and Contour Measurement Machine

ZEISS Industrial Quality Solutions



Surface, form and contour measurement machine applications range from automotive to aerospace to medical industries and beyond. While automobile manufacturers require precision-tooled pistons and crankshafts with low resistance, medical professionals look for prosthetics which operate with the least amount of friction.

Within these applications, surface, form and contour measurement machines offer true sub-micron level measurements. This is made possible through their design. Manufacturers rely on this finer measurement fidelity for applications like 2D and 3D surface wear analyses and full component rotational analyses.

To ensure that a component functions as designed, manufacturers must know what metrology is best suited to provide results. There are several variables to consider when figuring out which surface, form and contour measurement machine is right for your application.

Choosing the Right System for Your Applications

Whether you're inspecting automotive powertrain components, turbine blade root forms or orthopedic implants, you are facing critical surface, form and contour quality measurement challenges.

Choosing the right system(s) for your applications provides several quality inspection and manufacturing benefits, including:

- Guaranteeing the functionality of a part as designed
- Determining a part's longevity of use and warranty considerations
- Validating components with true sub-micron measurements for a tighter closed loop measurement cycle
- Enabling process improvement and control
- Meeting GD&T compliance on 2D contour measurements

In most cases, the data you need to collect on the part you are inspecting will determine the type of machine you need. Whether you need entry-level equipment or a high-end system comes down to the level of precision you need to achieve in your measurements. Additionally, where you intend to inspect your components — near production on the shop floor or in a quality lab for final audit — can help you decide what system best meets your needs.

Surface Finish and Contour Machines

Surface roughness is the result of the machining process and represents a combination of tool marks and form irregularities within the finish of the component. Surface profilometers measure roughness and other surface texture parameters with either contact or non-contact methods.

Most stylus-based surface measuring provides a 2D or line profile. By analyzing the curve profile and evaluating surface parameters and characterization, quality decisions can be made.

Roundness Machines

There are two common ways of measuring roundness — by constraining and rotating a part around a central datum axis while a detector records the variation of surface waveform or fixing the component while rotating the detector. The former is usually performed on small, high-precision parts, whereas the latter is better suited for larger and possibly non-circular components.

Traditional part rotating systems are suited for small to medium sized workpieces or parts. Overhead spindle or detector rotating systems lend themselves to larger heavier workpieces or parts.

Hybrid Sensors and Machines

For applications that depend on both contour and surface finish measurements, certain machines are configurable with variable or hybrid sensors. This saves time and expense as the machine becomes the manufacturer's all-in-one solution for their surface, form and contour inspection needs.

Hybrid machines and machines with hybrid sensor capabilities are ideal for both the shop floor and within the quality lab. This flexibility opens the potential for automated inspections which save time and reduce error.



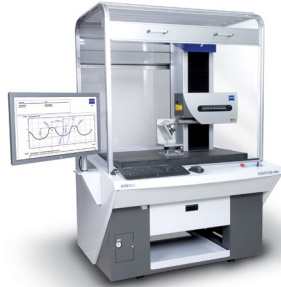
Tiered Quality Solutions

Depending on your budget, accuracy and application needs, ZEISS has a complete and configurable line of surface, form and contour metrology solutions to position you as a leader in your market.

Surface Finish and Contour Machines

Surfcom CREST

- Highest accuracy
- Surface finish measurement (Profile, Roughness and Waviness)



Surfcom NEX

- Flexibility
- Finish measurement (Profile, Roughness and Waviness)
- Contour measurement (With Hybrid detector)



Surfcom TOUCH

- Portability
- Surface finish measurement (Profile, Roughness and Waviness)



HandySURF+

- Portability
- Surface finish measurement (Roughness)



Roundness/Form Machines

Rondcom CREST

- Highest accuracy
- Roundness measurement
- Surface finish measurement (Optional — Profile, Roughness and Waviness)



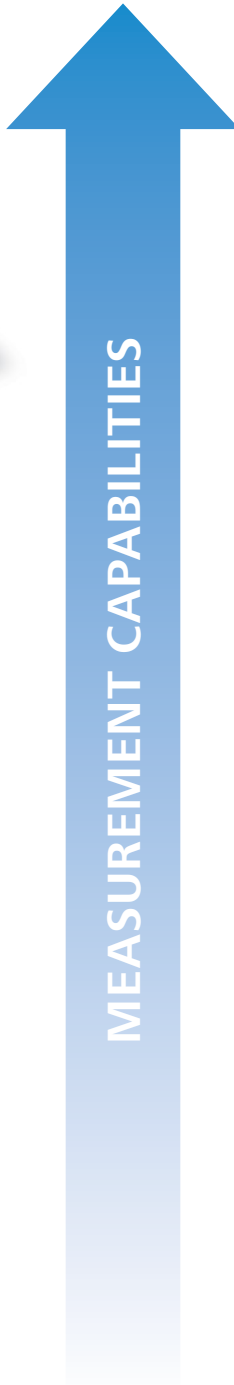
Rondcom NEX

- Flexibility
- Roundness measurement
- Finish measurement (Profile, Roughness and Waviness)



Rondcom TOUCH

- Portability
- Roundness measurement



Entry Level