

## Roughness and roundness combine for analysis of wear and useful life

Along with precision glass scales and precise motion control in all axes, Talyrond 565 also has extremely high data density and low instrument noise to make possible examination of the surface texture detail that occurs on critical geometric features. The ability to measure both at once enhances control of the manufacturing process and the analysis of functional performance.

### Measurement supports manufacturing

It is not coincidence that surface finish and roundness specifications are nearly always indicated on the same engineering drawing; they are inseparable in the manufacturing and eventual functioning of the component.

With awareness that errors of roundness and surface finish occur simultaneously at the manufacturing stage, it seems logical that an inspection instrument would measure roughness and roundness at the same time.

The Talyrond 565 has been developed with component function and the manufacturing process in mind. Equally important, the dual inspection functions have been seamlessly integrated into a single software package.

Measurement results can be combined on a single report in the same way that they appear together on the engineering drawing. Close-to-tolerance results influenced by the interaction of form and finish can be explored thoroughly and immediately.

### Dual purpose gauge head

The new Talymin 5 gauge provides both wide range for the evaluation of form errors and exceptional sensitivity for the assessment of surface finish and roughness.

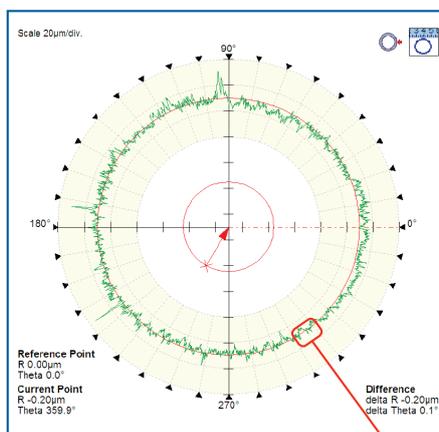
### Talymin 5 has resolution (1.2nm) superior to many dedicated roughness checkers!

This dual capability eliminates changing over of the gauge head or the adding on of attachments and accessories that can complicate the running of fully automatic measurement routines.

Adjustable gauging force and a selection of 5µm, 10µm or ball tipped styli provides for flexibility in the measurement of different types of components and materials.

Linear and circumferential measurements on inside and outside diameters as well as the top and bottom faces of lands, grooves and other flat surfaces can be measured.

### Circumferential surface roughness

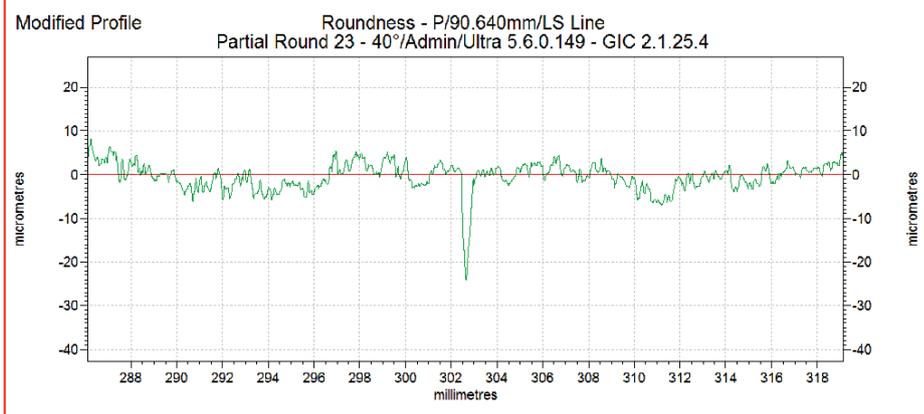


On some components, e.g. an injector seat or valve guide, it may be necessary to measure around the axis to ensure a correct seal. In this example the Talyrond 565 has been used to measure the component circumferentially utilizing a diamond stylus and 72,000 radial data points (0.005° data point spacing).

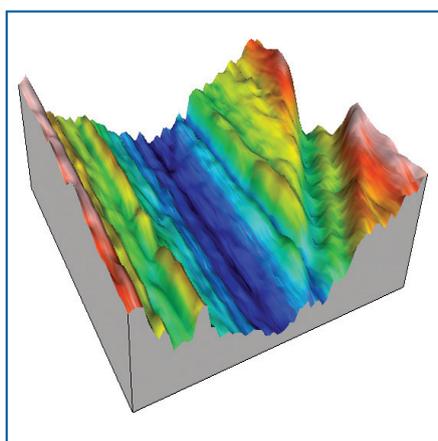
In the highlighted area a deep scratch has been detected. Rolling out that section of the trace into a linear profile gives a good indication of the nature of the scratch.

Further analysis of the profile will provide surface roughness parameters that may aid in determining the probable cause and possible correction of the problem.

### Modified Profile



### 3D Cylindrical mapping



While 2D profile information is often sufficient for problem solving, it may be beneficial to create a 3D "map" of the surface defect.

Talyrond 565 includes a unique capability called "3D Cylindrical Mapping" whereby a series of straightness traces are carried out and then combined into a 3D dataset.

As apparent in this example, the resultant high resolution, full color image offers an extraordinary view of the surface.

Equally important, a full set of 3D parameters are available to examine direction, depth, area, volume and other characteristics as a means of understanding how the defect may affect performance or function of the part.

## Powerful and comprehensive, Talyrond 565 evaluates surface roughness and roundness

### Linear axis surface roughness

Surface finish is measured on rotationally symmetric parts either around the axis or along the axis of the component depending on how the part has been produced (process control) and how it has been engineered to function (performance evaluation).

Linear axis measurement is typically used to determine roughness characteristics on sealing surfaces, oil retention qualities on bearing surfaces and degradation of cutting tool geometry on turning operations.

### High density data collection

Resolution is critical for both circumferential and linear measurements. Insufficient data point spacing can cause misinterpretation of results; particularly wavelengths.

Talyrond 565 has the option of 200,000 data points in both the horizontal and vertical measuring axes. This enables data point spacing down to 0.25µm allowing the user to examine the surface in detail without fear of error or misinterpretation.

Figures 1 and 2 (opposite) illustrate the difference between using high and low data density; measurements were taken on a camshaft bearing surface.

### Automatic alignment and inspection

Cylindrical components used in rotation are correctly measured for roughness parallel to their rotational axis which often means expensive fixturing is required to position the stylus "top dead center" to the axis.

### More than any other error, poor alignment leads to inconsistent measurement results!

With automatic center and leveling of the component, Talyrond 565 assures flawless alignment of the rotational axis and ends the need for time wasting fixtures or costly rework caused by operator set-up errors.

Automatic measurement runs reduce errors, free the operator for other tasks and can even be used with additional automation for high volume unattended batch inspection.

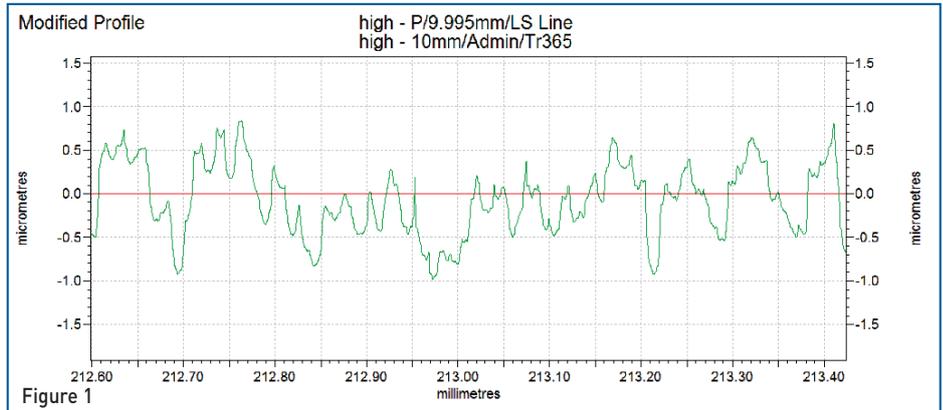


Figure 1  
Talyrond 565 can have up to 200,000 data points with 0.25µm spacing in both the vertical and horizontal axes. A full range of surface finish parameters can be calculated in accordance with international standards.

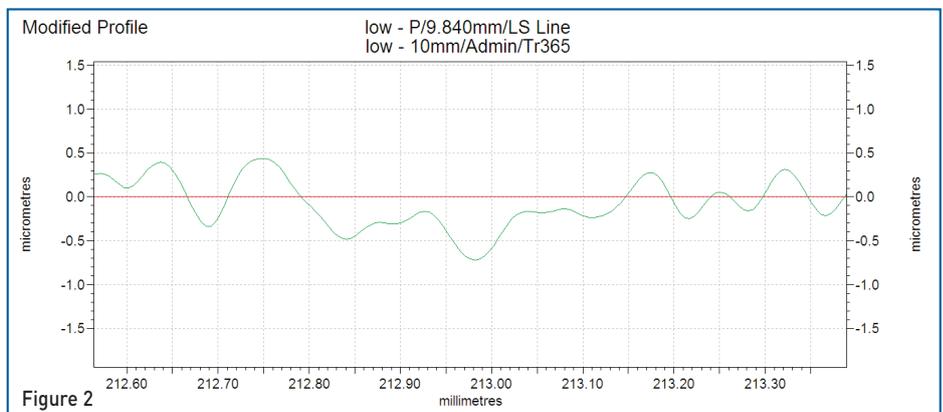


Figure 2  
The same measurement as shown above is displayed with data point spacing typical of most roundness instruments. Form characteristics such as straightness may be determined but it is not possible to calculate roughness.



### Multi-purpose instrument

Although this leaflet highlights surface finish capabilities, the Talyrond 565 also includes standard analysis software for all circular geometry requirements including those noted below. Refer to "Talyrond 565 Roundness Measurement Specification" for details.

- Roundness and partial arc roundness
- Cylindricity
- Radial runout
- Axial runout
- Vertical straightness
- Horizontal straightness (optional)
- Flatness and partial flatness
- Harmonic analysis
- Parallelism
- Squareness

Specifications are subject to change without notice. Availability of some features is dependent on instrument type.