



InfiniteFocus G Series Application Note

Full Report available at <https://bit.ly/33uszfX>

Application: 3D Optical GD&T
measurement of Automotive Parts

Bruker aliconna

Bruker Alicona is a leading global supplier of optical metrology solutions based on the principle of Focus Variation.

Focus Variation works on the basis of moving a focal plane over a surface and collecting robust 3D data which can then be used to measure geometric form and surface finish from a single optical sensor.

Measurement processes can be fully automated and provide GD&T measurement capabilities across all industrial & medical sectors.

The systems are in use in Industry, Industrial Research, Universities and production facilities globally.

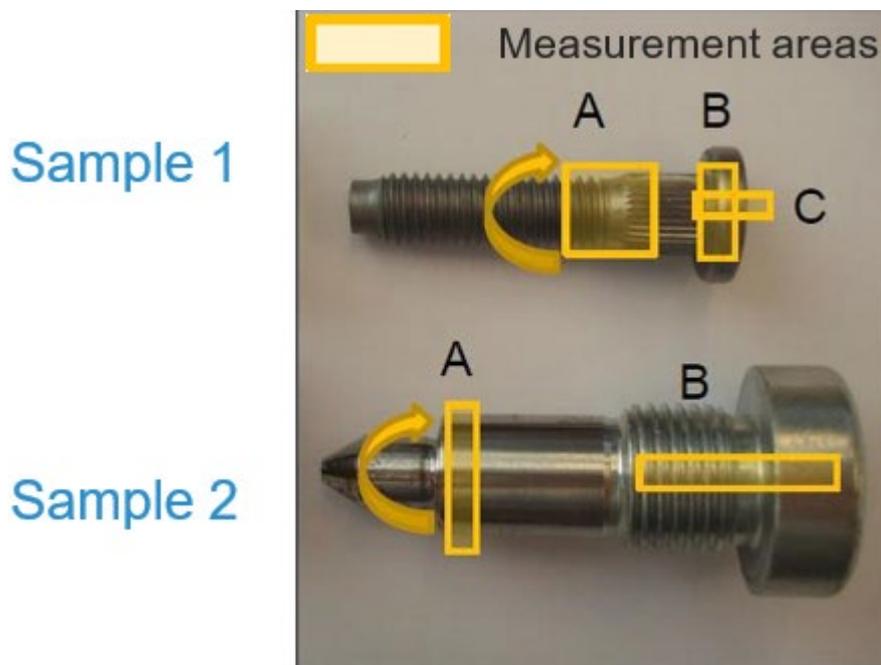
www.aliconna.com

Automotive Components Measurement

In this measurement report summary, we describe the use of the Bruker Alicona InfiniteFocusG5 to carry out GD&T measurements on automotive components. The components and the measurement positions are illustrated below

This report shows how, using optical metrology, it is easily possible to perform GD&T measurements to ensure reliable manufacturing of screw connections by measuring form, position, parallelism, flatness, screw pitch and serrations.

The full measurement report available at <https://bit.ly/33uszfX>



The measurement system used in this report is the InfiniteFocusG5 system fitted with an advanced real3D rotation unit. This allows a full 360° rotation of the sample to be measured.



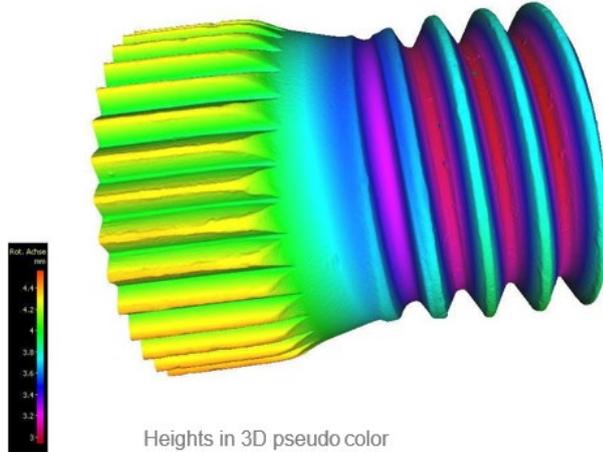
InfiniteFocusG5

InfiniteFocus is a highly accurate and flexible optical 3D measurement system based on the Focus Variation technology. Using only one sensor, users verify dimensional accuracy surface finish of their components. By means of Vertical Focus Probing, an extension of Focus Variation vertical surfaces can be probed laterally. Components in high accuracy, with a high vertical resolution and in high repeatability. The robust measurement principle of Focus Variation in combination with a vibration-isolating hardware allows the systems to be used in a manufacturing environment. With an automation interface, InfiniteFocus can also be used for fully automatic measurements in production.

A 3D model of sample 1 is created which is then displayed as a 3D model either in true colour or in pseudo colour related to height as shown below.

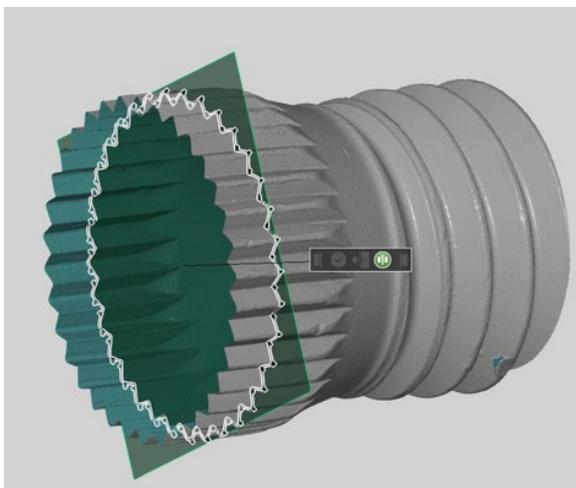


3D real color,

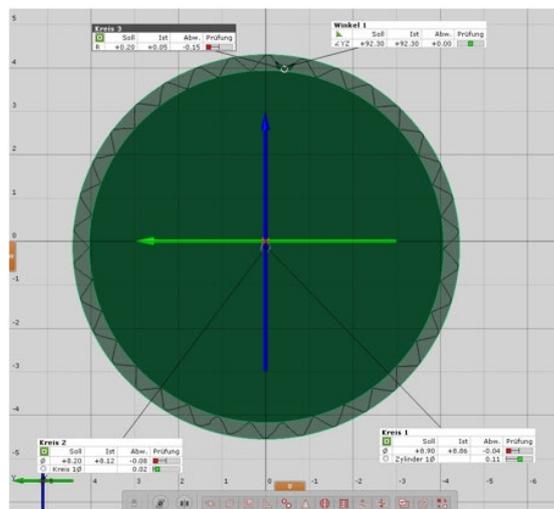


Heights in 3D pseudo color

Using the Alicona Inspect Module it is then possible to display and measure, at area A, the profile geometry as shown below describing, on the right, OD, ID, circumscribed element and inscribed element



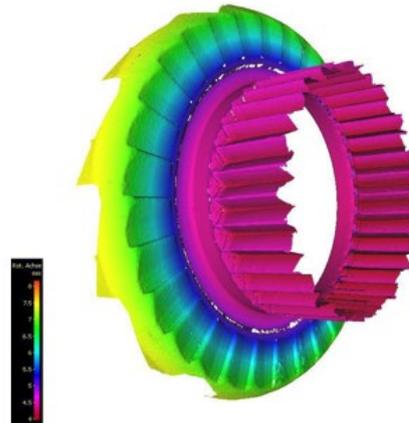
Single cut at gearing



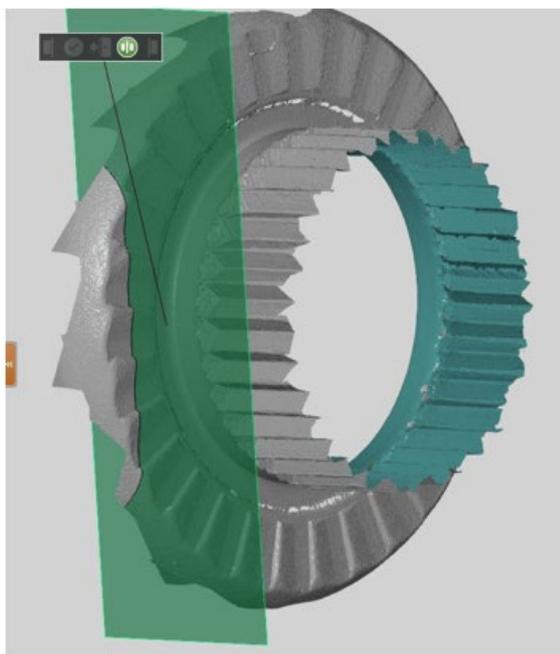
Using the same 3D model, a feature of optical metrology is that all dimensional information can be extracted without additional probing we then move to the measurement position B and display the 3D model in real colour and pseudo colour related to height, displayed below and measurements of angles, radii and distances made.



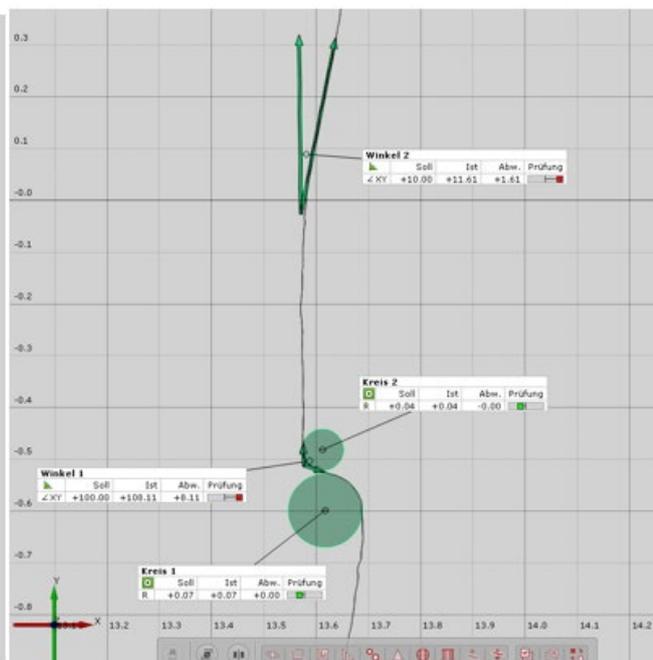
3D real color, polarisation



Heights in 3D pseudo color

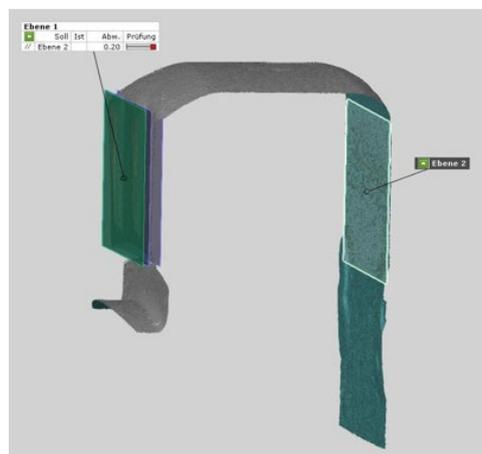


Single cut / Construction of gearing



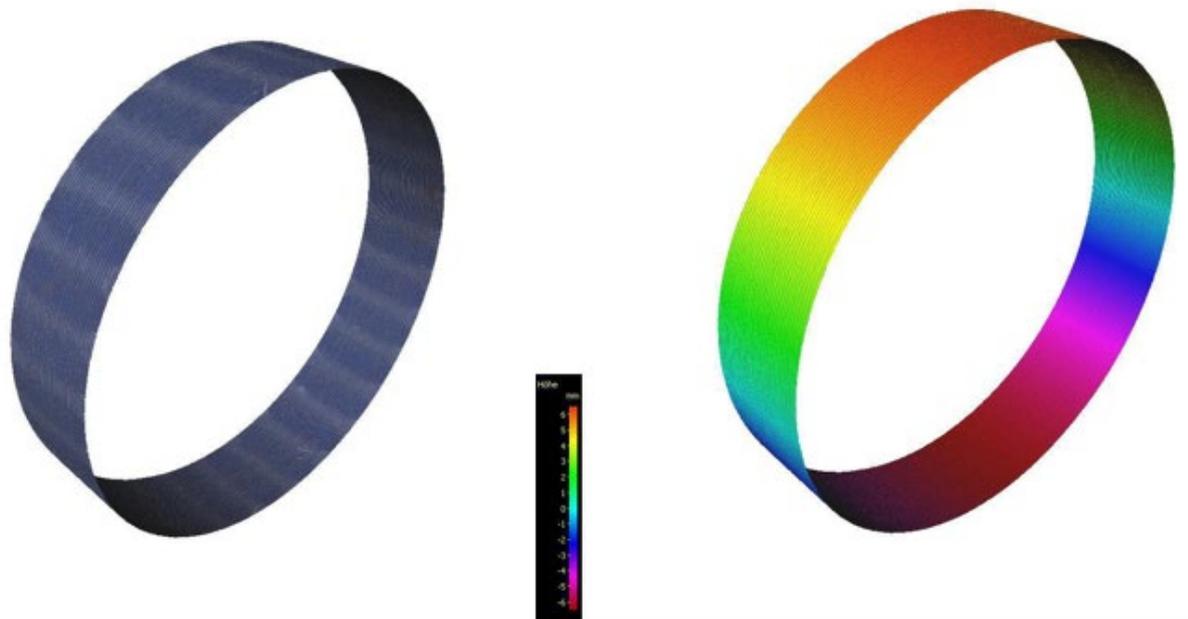
Measurement results

Parallelism on area C can now be made by selection of the region and using Alicona Inspect



Inspection of parallelism between plane 1 and plane 2

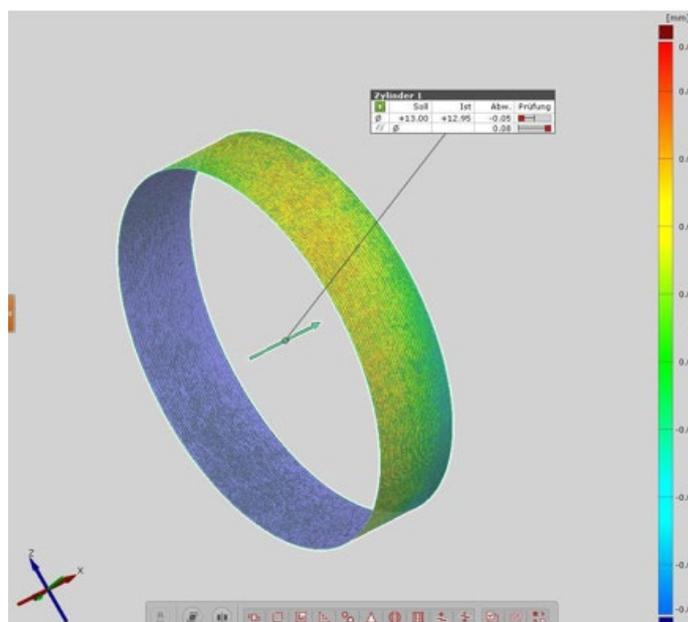
For sample 2 a new 3D model is created and displayed for the measurement of area A



3D real color

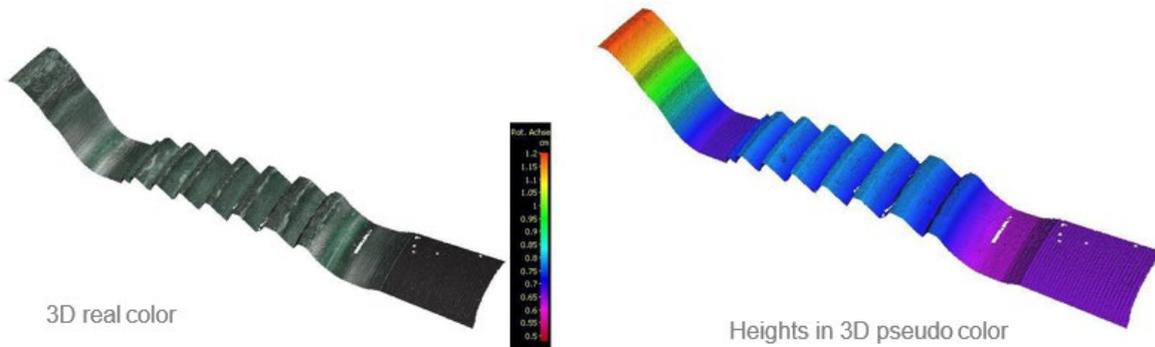
Heights in 3D pseudo color

A cylinder is fitted to the dataset to describe diameter and cylindricity as shown below.



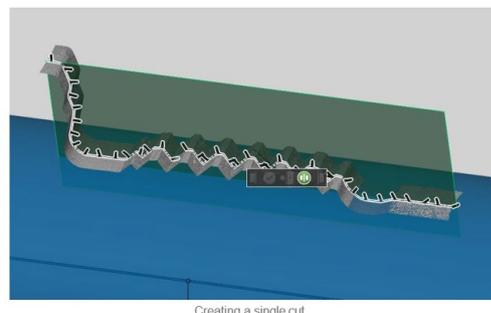
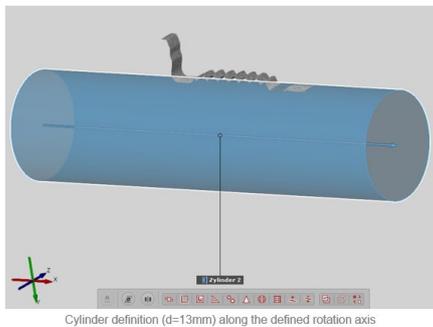
Inspection of diameter and cylindricity

For sample 2, area B the region of interest is selected and displayed, and the required measurements made.



Sample 2 - Measurement area B – Alicona Inspect – Fitting of cylinder

Sample 2 - Measurement area B – Alicona Inspect – Pattern construction



Summary

Using optical metrology allows a simple and easy to use method of measuring complex geometry and surface finish with a single measurement solution.

By using IF-AdvancedReal3DRotationUnit it is possible to measure components around 360° in high resolution, providing an areal analysis of the different required dimensions.

This guarantees a robust and repeatable quality control in addition to an optimization of manufacturing processes. The Bruker Alicona measurement system also allows the measurement of profile and area-based roughness conforming to ISO 4287, 4288 and ISO 25178. User-friendly handling and easy automation using the measurement Inspect measurement module.

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