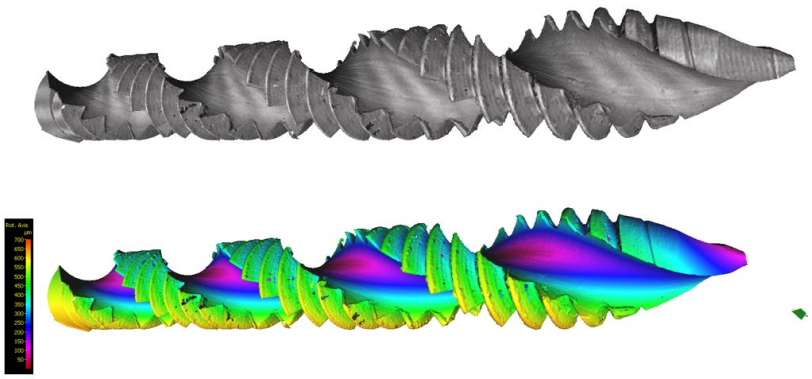
G Series Application Note

Full Report available at https://bit.ly/3cTTsjF

Application: Measurement of Surface Coatings



Bruker alicona

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.

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Introduction

In this measurement report summary, we describe the use of Optical Metrology to measure the difference between two parts. This case is gold coating on a cutting tool, however this can either be a good part against a bad part or a part comparison against a CAD file.

The full measurement report available at https://bit.ly/3cTTsjF

The metrology system used for this task is the InfiniteFocus G5plus system fitted with an Advanced real3D rotation device, shown below in Figure 1.

Figure 1

In use the parts to be measured are located in a 3-jaw mounting chuck, the illustration below, Figure 2, shows tool ready mounted for measurement. In this case one tool is coated with Gold and the other one is uncoated,

Figure 2

The valve is then scanned, and a 3D model is created and displayed in either true colour or in pseudo colour related to height as shown below in Figure 3. The left image is gold coated, the right image is uncoated

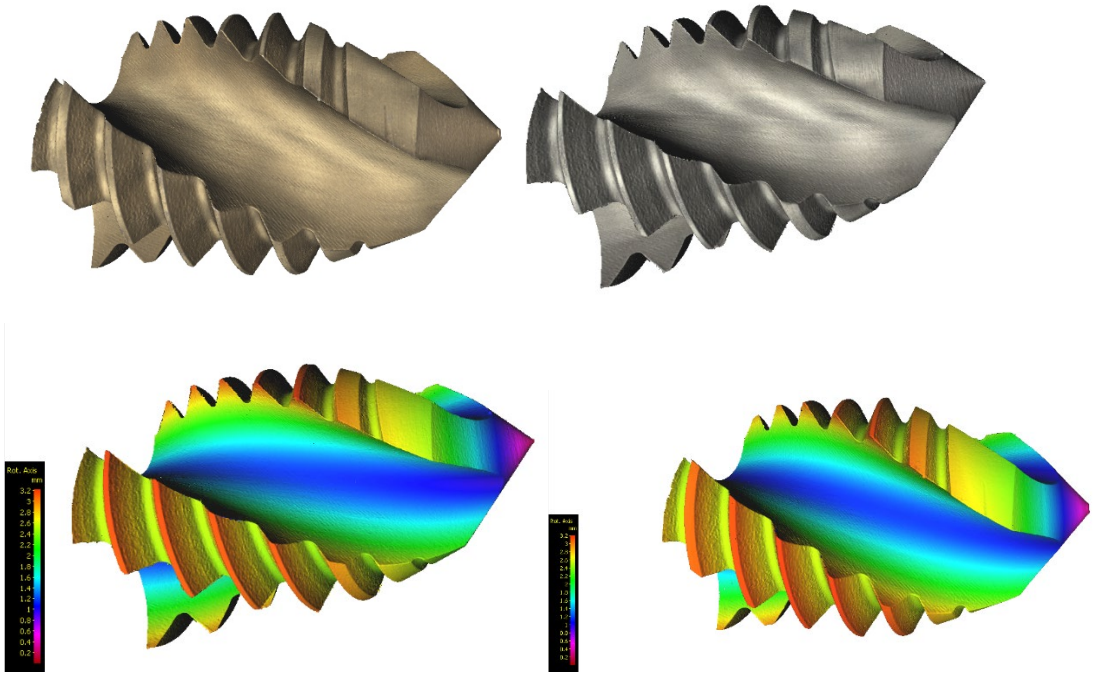

Figure 3

Using the Alicona Inspect software the 2 datasets are merged and aligned, as shown in Figure 4, the blue data being the gold coating.

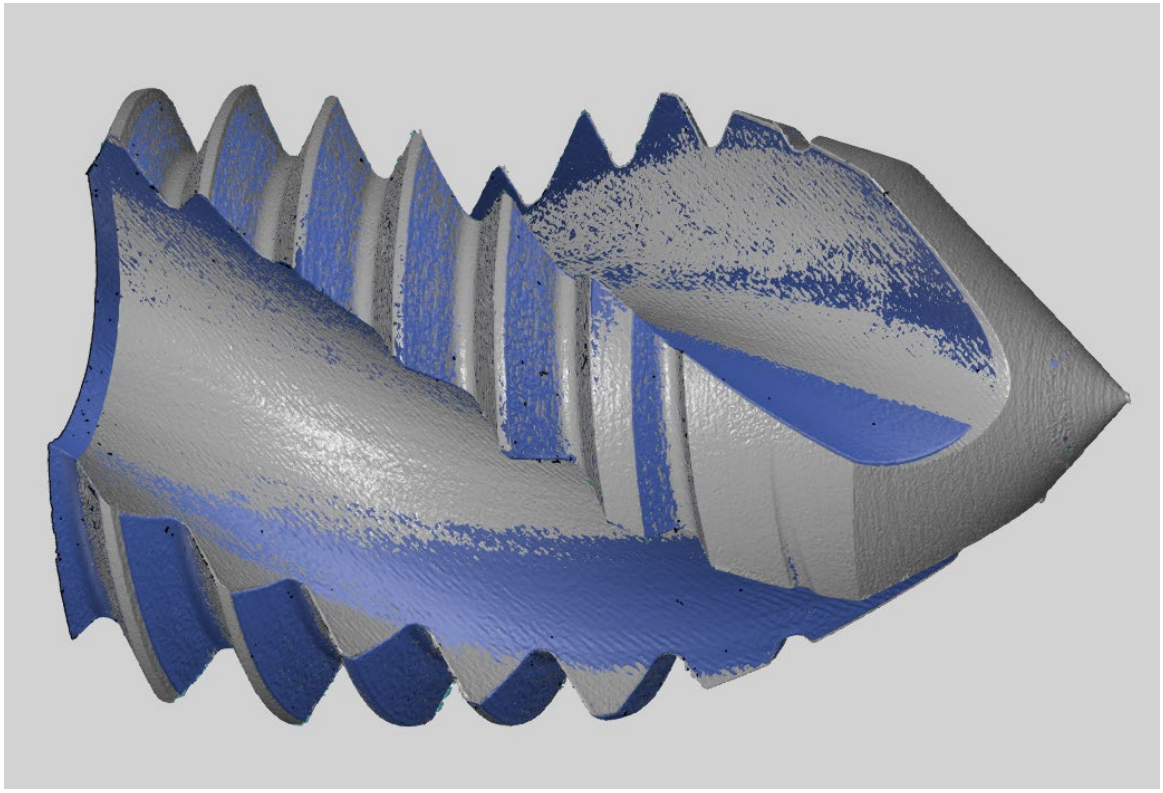

Figure 4

Using now the Alicona Inspect the combined datasets van then be measured to display the deviation as illustrated below, Figure 5.

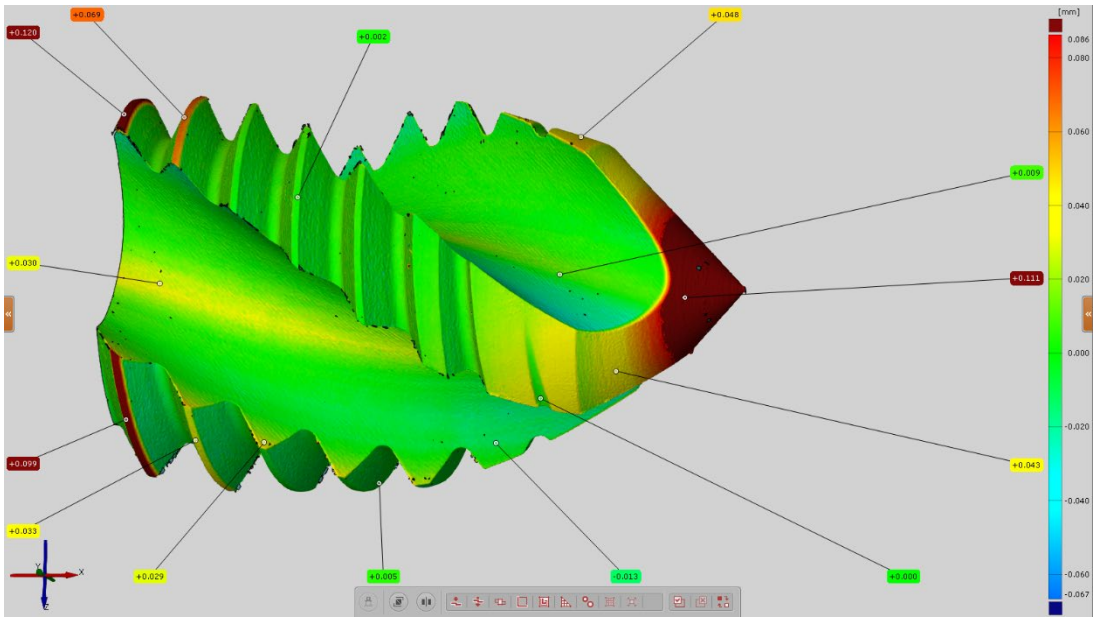

Figure 5

By creating a section through the tool, it is now possible to measure the coating thickness around that section as shown below, Figure 6

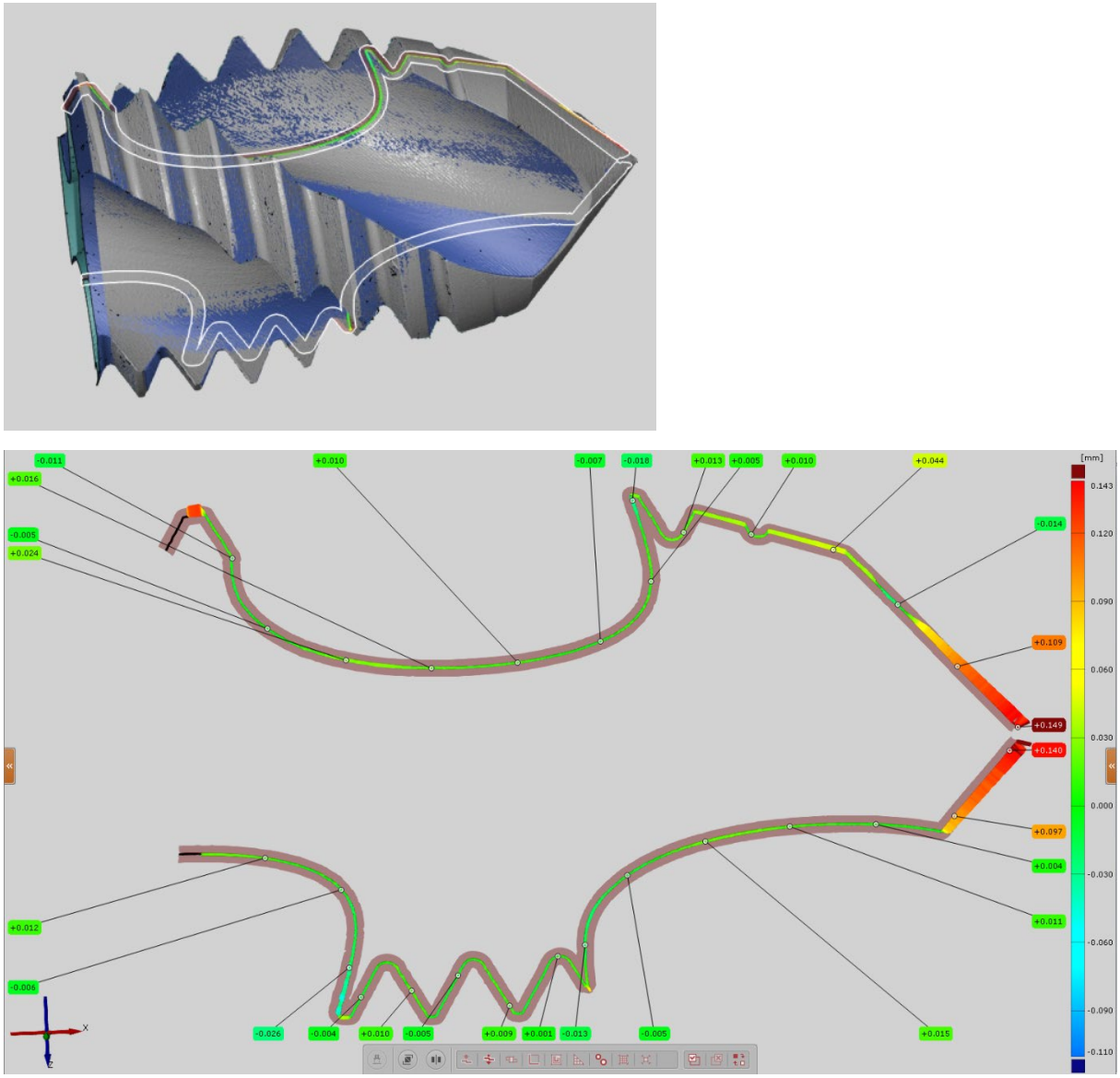

Figure 6

A “one click” full measurement report is then available providing the full measurement parameters, Figure 7.

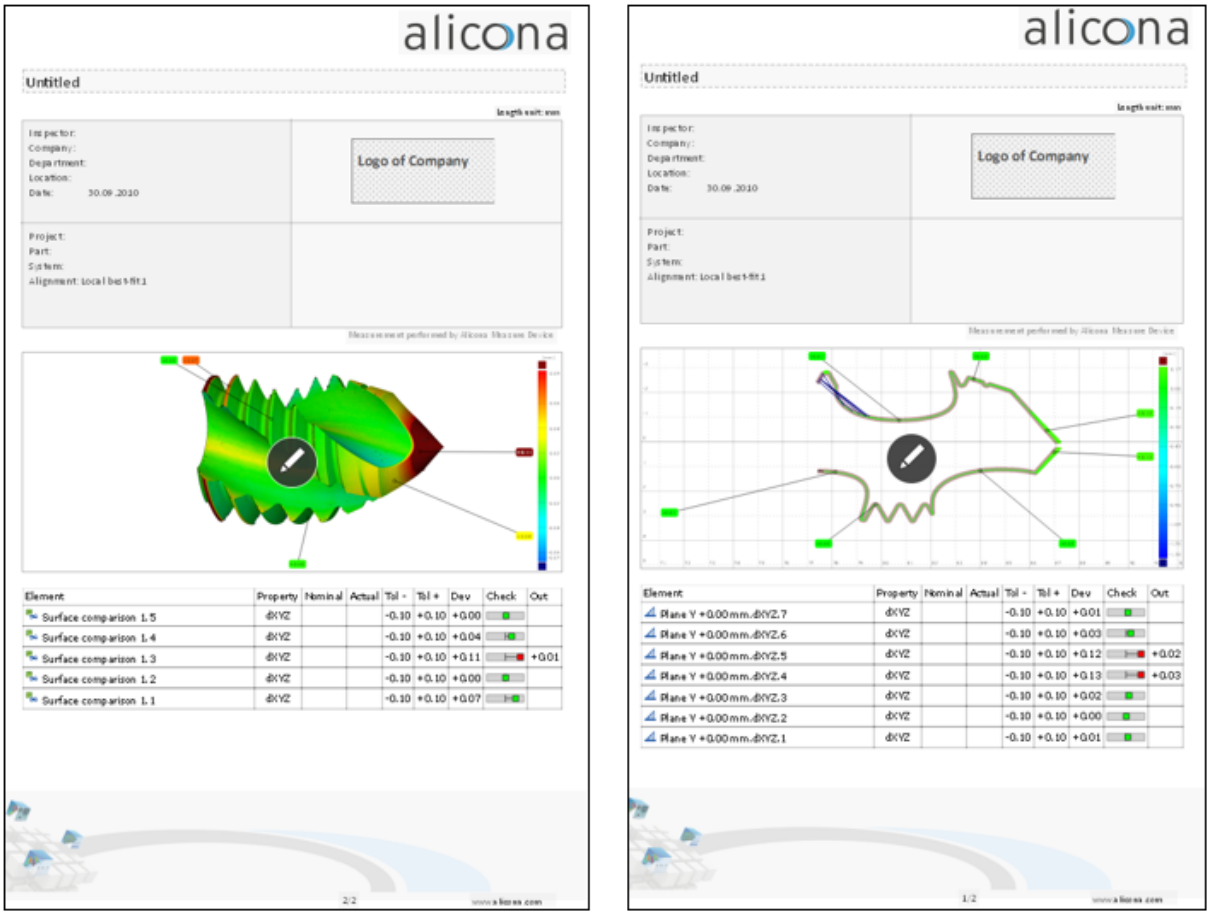

Figure 7

Summary:

It can be seen from this application note that using Optical Metrology provides a unique solution for the measurement of coating thickness on components. By creating a “master” or “Golden” tool and creating a 3D dataset testing can easily be achieved by creating a 3D model of a coated product and comparing the data to measure differences without damage to the coating. The example here is a complex cutting tool which is a worst-case scenario in terms of complexity for this application.

The InfiniteFocus G5plus used for this report 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.