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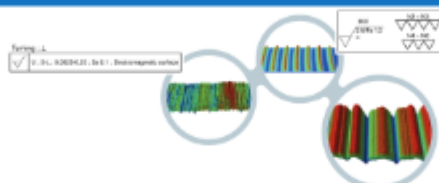
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Advantages of Measuring Surface Roughness with White Light Interferometry

This application note discusses the use of mean roughness measurements with white light interferometry (WLI) optical profilers. Spatial filters are explained, as well as some of the normative standards requirements from ASME B46.1-2009, ISO 13565-12 and JIS B 0671-1. Main technical reasons for WLI selection are covered as well as the advantages and areas of applicability of the full areal measurement standard from ISO 25178-2.

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Application Note #575 Advantages of Measuring Surface Roughness with White Light Interferometry

The concept of measuring surface roughness originated nearly a century ago as a means to assess consistency and dependability between manufacturers and buyers. Now, it has become a common identifier used throughout industry for validating manufacturing processes, confirming adherence to both internal and regulatory specifications, and guaranteeing quality and performance of end products. Subjective judgments of quality based on naked-eye observation or fingertouch feel of surfaces has steadily been replaced by unbiased metrics and well-defined formulas. The first parameter developed for these endeavors was mean roughness (Ra), which for a number of reasons, is still a primary reference parameter used today. First, mean roughness is easy to work with, even in an analogic way, which was only less important in early implementation across a variety of industries, but also because it is convenient and quick method for current situations. Second, the Ra parameter is a robust calculation that averages outlier data and provides consistent results irrespective of the roughness pattern. This is critically important to not only assist with a wide variety of industrial manufacturing processes, but also to provide a solid baseline for process improvement. Adoption of Ra as a key parameter to qualify surface roughness refers on defined standard variables to avoid all of the desired profile measurement. These are relatively easy to manufacture for a single line profile and are commonly used to assess if a roughness measurement

system is properly calibrated. This ensures that the Ra value given for a specific surface is linked back to a well-established reference value. Such standards also help to achieve a common reference across multi-industry data and provide tool to tool correlation in multi-industry systems. While these standards were originally designed for the superior measurements of stylus based profilers, they are able also to confirm that both contact and non-contact areal based profilers acquire the correct results.



Figure 1: Illustration of mean roughness calculation. This application note discusses the use of mean roughness measurements with white light interferometry (WLI) optical profilers. Spatial filters are explained, as well as some of the normative standards requirements from ASME B46.1-2009, ISO 13565-12 and JIS B 0671-1. Main technical reasons for WLI selection are covered as well as the advantages and areas of applicability of the full areal measurement standard from ISO 25178-2.



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