

Extract from the annual report 2014  
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## WEAR AND COATING-THICKNESS MEASUREMENT IN A SINGLE STEP

For many years both the wear resistance and the thickness of coatings have been measured by the well-established ball-cratering method. This method has been further developed at the Fraunhofer IST such that wear and coating thickness measurement works automatically. In comparison with conventional crater grinding, time is saved and more reliable results are obtained.

### The ball-cratering method

This method is easy to handle and at the same time provides very meaningful results. It is especially interesting from the aspect of low budget investment requirements. The standard DIN EN 1071 describes measurement of coating thickness and calculation of the wear coefficient. The functional reliability of components depends to a very great extent on these two characteristics.

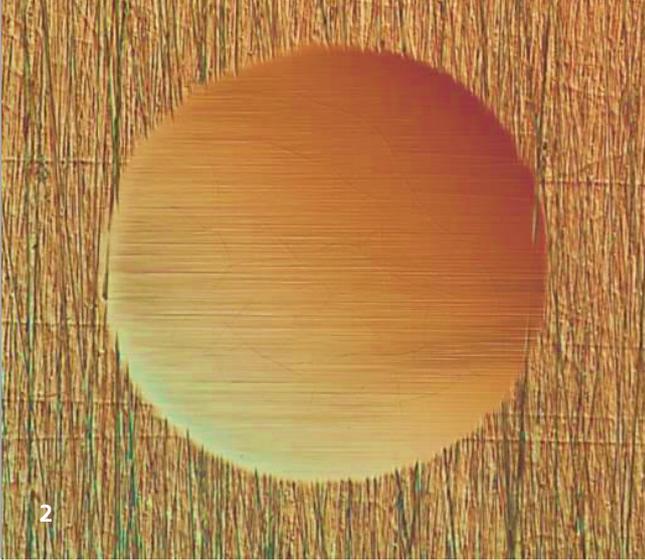
A reliable determination of the crater diameter is the crux of the matter in calculating wear and coating thickness. Currently this requires the following three individual operations:

- | the grinding process itself
- | -----
- | cleaning of the component, and
- | -----
- | a visual and microscopic appraisal of the crater.
- | -----

Particularly the evaluation of the grinding result, this means, measuring the crater diameter is a critical point because this requires manual processing. Thus the results are based on a great extent on the individual experience of the scientists. For this reason this commonly used method is not very suitable for industrial and automated quality assurance systems.

### Automated wear and coating thickness measurement

The Fraunhofer IST's modified tester only requires one individual operation. In this newly developed method the penetration of the grinding ball, this means the crater depth, is measured continuously during the grinding process. For this reason there is no need for a subjective evaluation of the grinding result. A position sensor (see Fig. 1) detects the position of the rotating ball. The measured values for the crater depth are displayed in real time as a function of the grinding duration, as can be seen in the diagram to the right.

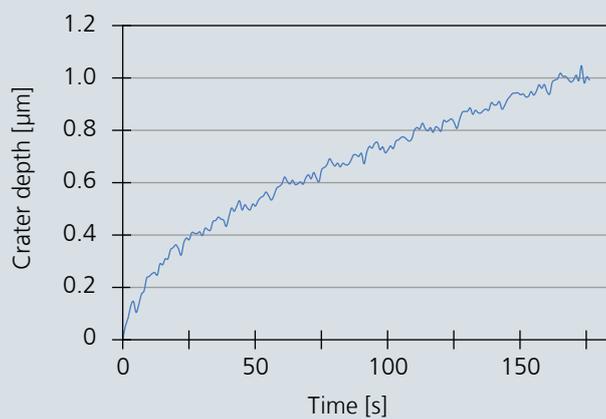


1 *Ball-cratering device with position sensor*

2 *Wear crater.*

The idea behind further development of the ball-cratering method is to support coating development with innovative and efficient methods of characterization. The grinding process can now be followed on-line. This is a major step forward to achieve an improved understanding of material properties. Measurement of coating thickness should be determined via the different wear rates of the coating and base material.

Crater depth as a function of the grinding duration.



## CONTACT

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