

INNOVATION

muraR



Detection of Hardness Variance by X-Ray Diffractometry

Fast, automatable and contactless hardness variance scans by evaluation of X-ray signals.

The hardness of components is a critical property for wear resistance and is adjusted with a suitable heat treatment. Hardness can also be affected by other manufacturing processes. For example, care must be taken during grinding operations to avoid grinding burn. The detection of such hardness defects can be carried out especially quickly and yet with sufficient accuracy by evaluating the signal width of an X-ray signal.

With the muraR, sentenso presents a very efficient solution to determine hardness variance on surfaces of steel components.

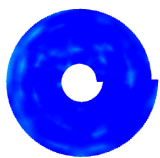
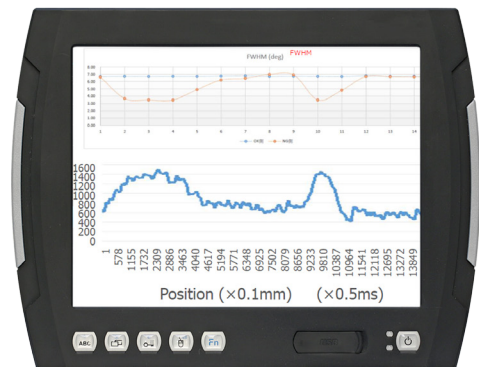


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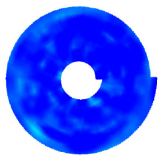


Setup and Functions

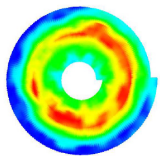
Hardness variances on component surfaces can be determined quickly and automatically with an X-ray diffractometer by evaluating the full width half-maximum (FWHM). The half-value width is a characteristic value of the X-ray diffracted at the crystal lattice and describes the signal width at half the height of the maximum. The X-ray signal from the chromium X-ray source is detected without contact via scintillation counters.



Hardness profile OK



Hardness profile OK



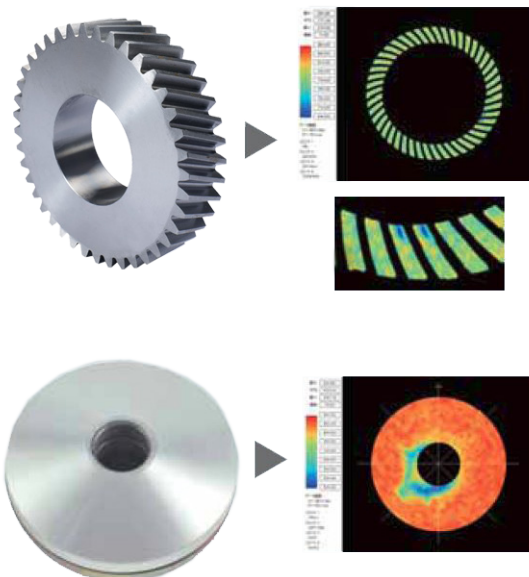
Grinding burn

Automated measurement tasks can be easily programmed and implemented using an optional collaborative or industrial robot.

The muraR can be used in a variety of different measurement tasks:

- Check of hardness variance after heat treatments
- Detection of grinding burn
- Automated test procedures in production

The FWHM increases with increasing hardness, which is why a hardness variance can be determined via a surface scan for known materials. Since the X-ray tube operates with a low tube current, there is a very low radiation emission, which can be completely avoided by simple protective measures. At a safe distance of 1.5 m or behind a 5 mm thick PVC shield, no additional radiation exposure to the natural radiation can be detected.



The muraR allows for fast and high-resolution hardness scans with a high degree of automation. These can be demonstrated in the sentenso laboratory or in a video conference with customer-specific samples.

