

# BARKHAUSEN NOISE ANALYSIS

Non-destructive (NDT) measurement solutions  
for grinding burn and heat treat defect testing



 stresstech  
*Measure for success*

# Barkhausen Noise Analysis

Optimize your manufacturing process and deliver the highest quality components by using Barkhausen noise analysis for detection of grinding burn damage and heat treatment defects.

## Analysis

Barkhausen noise analysis is a non-destructive method involving the measurement of a noise like signal induced in a ferromagnetic material by an applied magnetic field.

There are two main material characteristics that will directly affect the intensity of the Barkhausen noise signal:

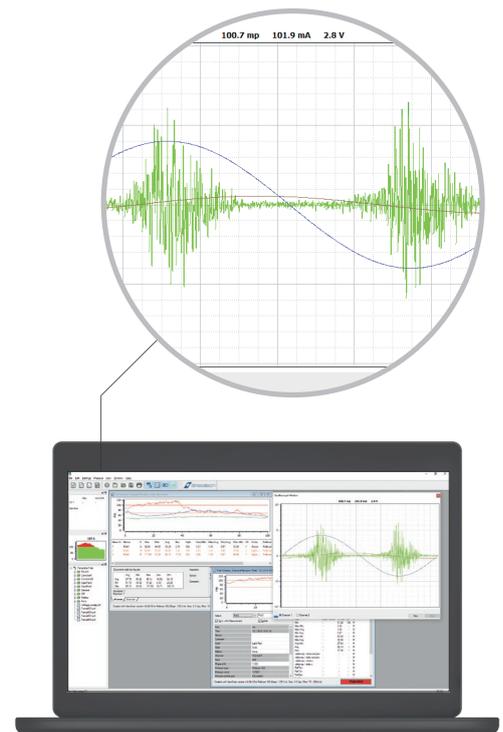
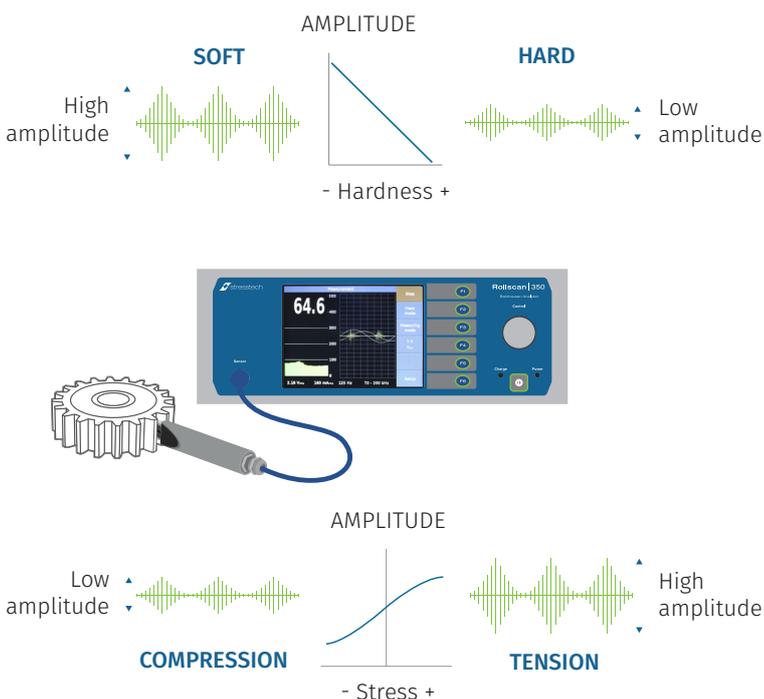
- ✓ The microstructure of the sample – this effect can be broadly described in terms of hardness: the noise intensity continuously decreases in microstructures characterized by increasing hardness.
- ✓ Presence and distribution of elastic stresses – compressive stresses will decrease the intensity of Barkhausen noise while tensile stresses increase the intensity.

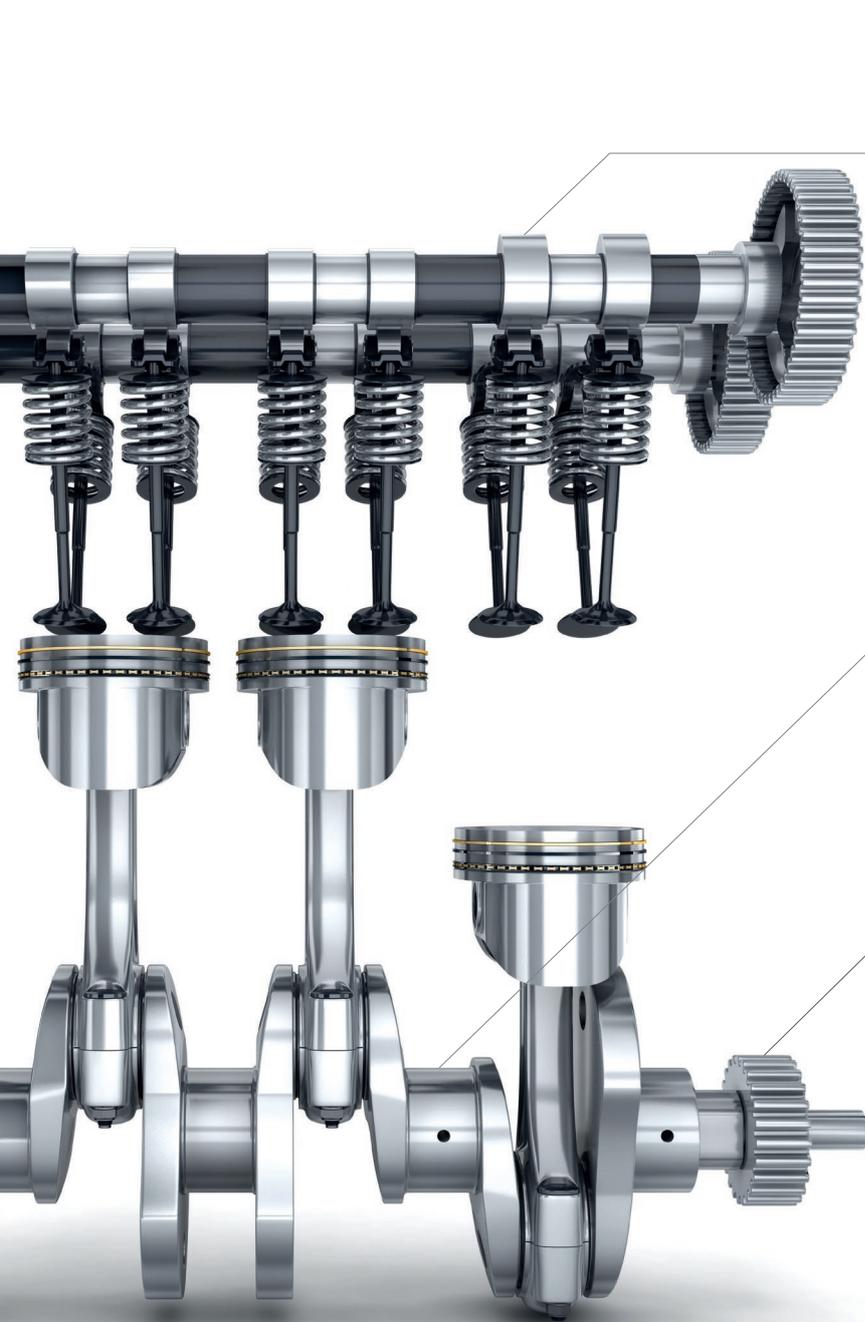
## Measurement principle

Barkhausen noise analysis requires the use of a Barkhausen noise signal analyzer (Rollscan) and sensor. Additional data collection software can be utilized for data tracking and exporting, surface mapping, and automated measurement evaluation.

Performing Barkhausen noise measurements is a simple process:

1. Measurement area is magnetized with alternating magnetic field by the sensor
2. During magnetization the sensor measures the Barkhausen noise signal and transfers it to Rollscan
3. Real-time measured values are displayed on Rollscan and/or the ViewScan software





Camshafts



Crankshafts



Gears



Landing gears



Bearings



Grooves and holes



## Applications

Many manufacturing processes involve some modification of stress and/or microstructure that can be readily analyzed with Barkhausen noise.

Examples include:

- ✓ Machining – grinding, turning, milling
- ✓ Cold working – shot peening, laser peening, autofrettage
- ✓ Surface hardening – carburizing, nitriding, induction hardening

Various dynamic processes such as creep and fatigue similarly involve changes in stress and microstructure and can also be monitored with Barkhausen noise.

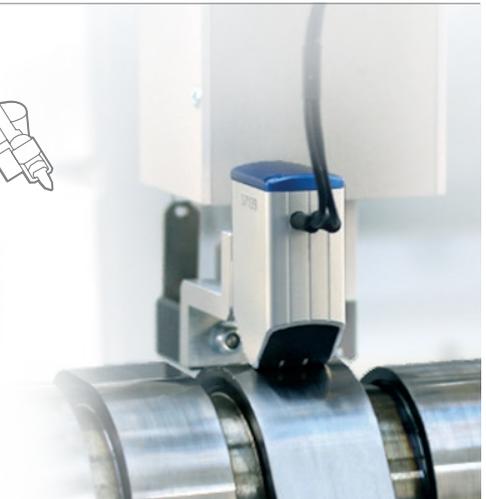
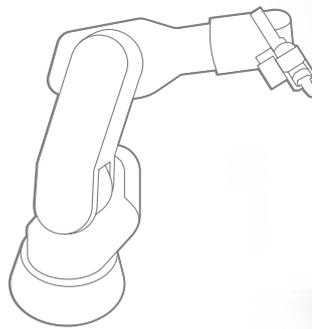
# Barkhausen Noise Analysis System

Main features of Barkhausen noise measurement system are:

- ✓ Rollscan signal analyzer
- ✓ Barkhausen noise sensor(s)
- ✓ ViewScan or MicroScan software for data acquisition and analysis
- ✓ Component handling system for camshafts, crankshafts, gears or other parts

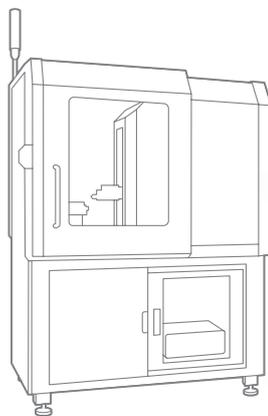
## Inline systems

Inline systems can be integrated into the production line to ensure immediate reaction to process changes. Production data is collected automatically and can be analyzed and used for process optimization.



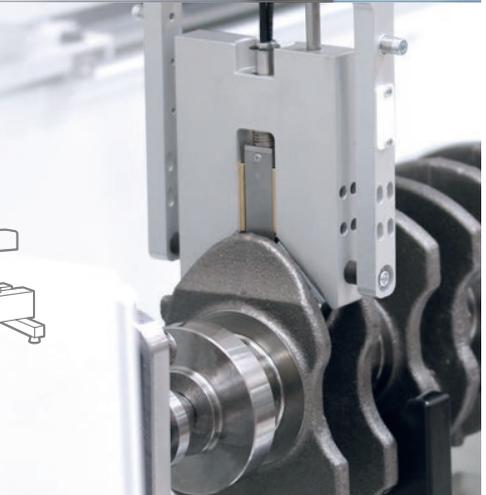
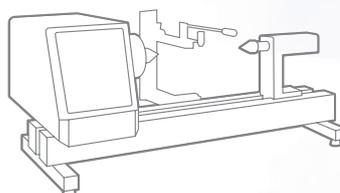
## Automated systems

Automated systems for quality inspection are tailored for offline use. Easy to use software make inspections intuitive and systems can adapt to various component types.



## Semi-automated and manual systems

Semi-automated and manual Barkhausen noise analysis systems are suitable for low volume measurements. The most simple Barkhausen noise measurements can be performed handheld with only a sensor and analyzer.





## Rollscan signal analyzers



**Rollscan 350** with graphical display for manual and automatic systems



**Rollscan 320** for automatic and semi-automatic multi-channel systems



**Rollscan 250** for manual and automatic two-channel systems

## Barkhausen noise sensors

customized for your parts

- ✓ Camshafts
- ✓ Crankshafts
- ✓ Gears
- ✓ Bearings
- ✓ Grooves and holes
- ✓ Various ID, OD and flat surfaces



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