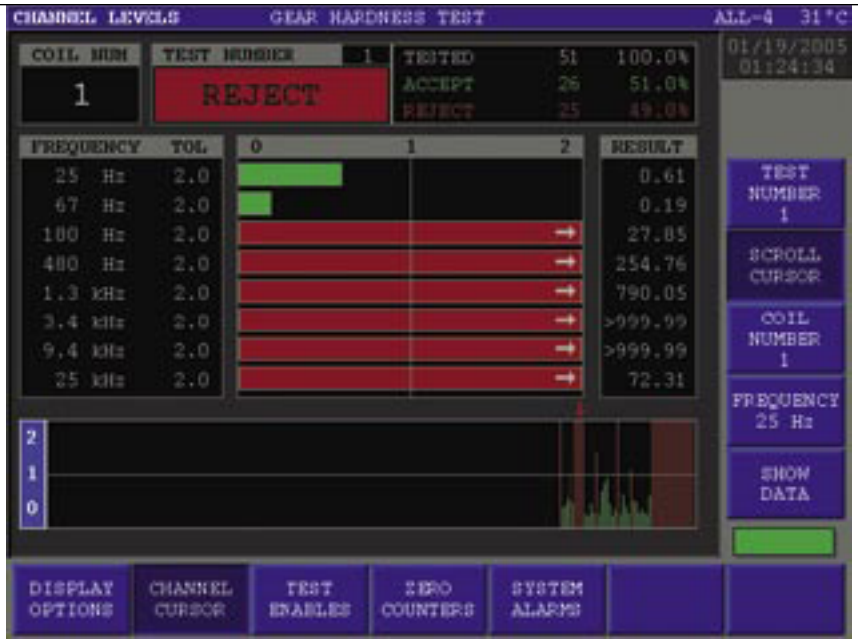
CRITERION NDT

Hardness, Case Depth and Structure Analysis

Eddy Current testing is a tried and proven technique for the comparison of one part to another or to a standard part. Alternating magnetic fields are produced by applying an AC voltage to a coil, sometimes called a driver coil. The magnetic fields will create a current, known as an eddy current in the part when the primary or driven coil is in close proximity to the part. The eddy currents in turn create their own magnetic field which interacts with the primary magnetic field. By comparing the relationship of this interaction with the data collected from the testing of known good and known bad parts, the parts can be sorted very accurately and quickly.



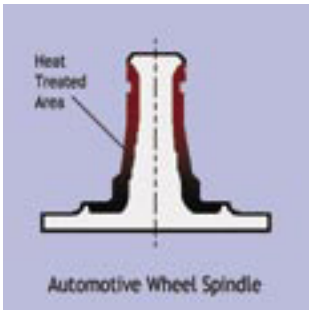
Typical Hardness Test Data

There are two methods of testing; Internal Reference testing where the driver and pick up coils are situated in a single housing and External Reference testing where two encircling coils are used, one of which is placed around a known good part. While internal reference testing can satisfy the needs of many applications, external reference testing offers the greater sensitivity.

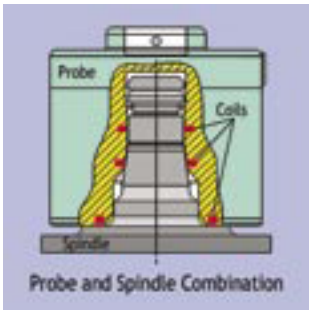
Frequency selection is vital when performing case depth analysis because the magnitude of the eddy currents is directly proportional to the depth of penetration which is in turn related to the frequency. High frequencies do not penetrate as far as low frequencies but produce stronger eddy currents. It will quickly be apparent that selection of an incorrect frequency could easily lead to false pass or false reject situations.

Many manufactured parts require heat treating with induction heating processes that allow specific areas to be heated and quenched.

During the process, failures can occur such as: shallow case, misplaced case, or delayed quench. "Circling" type probes check hardness in very specific areas on the part that are determined as critical.



Automotive Wheel Spindle



Probe and Spindle Combination

CRITERION NDT

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Crack and Flaw Detection

Crack and Flaw Testing.

Just as the variations in material structure induced by heat treating a product will influence the eddy currents and hence the magnetic interaction measured by the pick up coil, physical differences encountered at the surface will disrupt the eddy currents and their associated magnetic fields. The interpretation of the disruptions and comparison with the disruption introduced by a measurable standard determine the pass or reject result.

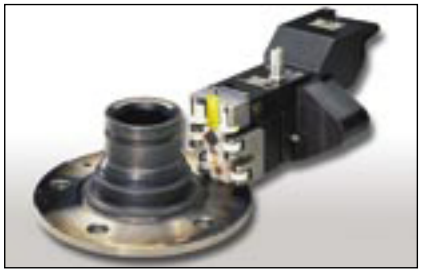
Unlike hardness or heat treat testing, the crack test requires that the part or probe be dynamically scanned or rotated. In effect it is it's own self reference. The probe scans the part comparing surface conditions just fractions of a millimeter apart.

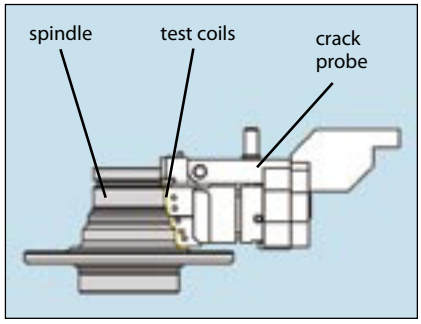
Typical Crack Test Data

Probes and Coils. Key to the success of any Eddy Current application is the design, reliability and robustness of the probes or coils.

Unless properly interfaced, a rotating part can destroy an expensive probe immediately or wear it down prematurely. Criterion NDT probes feature wear resistant ceramic wheels which ride the surface of the part and keep the coil in the correct position. Whenever possible the probes are designed so that the elements are interchangeable for ease of replacement. These features extend the life of the probe and reduce the cost of ownership.

A Criterion NDT application solution, coupled with a Zetec InSite Eddy Current test instrument provides a highly sensitive, reliable test system for 100% product inspection.





Simultaneous testing of multiple critical locations on the spindle is possible.

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