Multidirectional Equipment for Magnetic Particle Inspection

Multidirectional units allow the component to be magnetized in two directions, longitudinally and circumferentially, in rapid succession. Therefore, inspections are conducted without the need for a second shot. In multidirectional units, the two fields are balanced so that the field strengths are equal in both directions. These quickly changing balanced fields produce a multidirectional field in the component providing detection of defects lying in more than one direction.

Image Courtesy of Magnaflux

Just as in conventional wet-horizontal systems, the electrical current used in multidirectional magnetization may be alternating, half-wave direct, or full-wave. It is also possible to use a combination of currents depending on the test applications. Multidirectional magnetization can be used for a large number of production applications, and high volume inspections.

To determine adequate field strength and balance of the rapidly changing fields, technique development requires a little more effort when multidirectional equipment is used. It is desirable to develop the technique using a component with known defects oriented in at least two directions, or a manufactured defect standard. Quantitative Quality Indicators (QQI) are also often used to verify the strength and direction of magnetic fields.