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Magnetic Particle Testing (MT) | Magnetic Particle Inspection (MPI)

Magnetic particle testing (MT) or Magnetic Particle Inspection (MPI) is a relatively simple test method that can be applied to ferromagnetic materials including finished articles, billets, hot rolled bars, castings, and forgings. It requires magnetising the piece to be examined, applying the inspection medium or particles, and interpreting the patterns formed by the particles when they are attracted to the magnetic leakage field created by discontinuities in the part. Magnetic particle testing is performed using visible or fluorescent mediums; the particles can be wet (suspended in a fluid) or in the form of a dry powder. Visible wet particles are typically black and can be used with white contrast paint to improve visibility. Visible dry particles are available in red, black, yellow, and grey. They may be used with contrast paint to improve visibility. Fluorescent magnetic particle testing is more sensitive than the visible method. It is only available as a wet method. Contrast paint is not normally used. It requires the use of a UV-A lamp and a darkened area for viewing and interpreting indications. There are a variety of methods used to provide the magnetic field: yoke method (indirect), prod/clamp method (direct), and bench method – headshot (direct), coil (indirect). Typically, magnetic particle inspection will require access to a power source to create the magnetic field and for the UV-A lamp necessary for the fluorescent medium.

THE Applus+ SOLUTION

Applus+ only uses magnetic particle equipment and supplies from reputable manufacturers who ensure their products meet code requirements. Our technicians are trained in accordance with a written practice that complies with ASNT-SNT-TC-1A. Applus+ has qualified technicians and staff available to meet our clients' needs as challenges arise.

Target customers

Magnetic particle testing can be used at any point in a product's life cycle from initial forming of the ingots to the final wrought or welded products as well as after the item has been placed in service.

Industries that use magnetic particle inspection are:

- Structural steel
- Automotive
- Petrochemical
- Power generation
- Aerospace
- Maritime
- Food processing
- Paper production

Discontinuities can include:

- Cracks
- Laminations
- Seams
- Porosity
- Pipe
- Cold shuts
- Hot tears
- Lack of fusion

These discontinuities are surface or so near surface as to be detectable.

Key customer benefits

The complexity of modern industry and the demand for safer and more reliable products and equipment dictates the use of fabrication and testing procedures that ensure maximum reliability. Magnetic particle testing, when applied properly, can provide:

- Increased product reliability

- Improved production processes by identifying problems in a timely fashion so that they can be corrected
- Reduced costs in terms of fewer returned items and less rework
- Overall improved quality