

[Home](#) - [Education Resources](#) - [NDT Course Material](#) - [MPI](#)[Back](#)

Dry Particle Inspection

[Next](#)[Introduction to Magnetic Particle Inspection](#)

In this magnetic particle testing technique, dry particles are dusted onto the surface of the test object as the item is magnetized. Dry particle inspection is well suited for the inspections conducted on rough surfaces. When an electromagnetic yoke is used, the AC or half wave DC current creates a pulsating magnetic field that provides mobility to the powder. The primary applications for dry powders are unground welds and rough as-cast surfaces.

Dry particle inspection is also used to detect shallow subsurface cracks. Dry particles with half wave DC is the best approach when inspecting for lack of root penetration in welds of thin materials. Half wave DC with prods and dry particles is commonly used when inspecting large castings for hot tears and cracks.



Introduction

[Introduction](#)
[Basic Principles](#)
[History of MPI](#)

Physics

[Magnetism](#)
[Magnetic Mat'l's](#)
[Magnetic Domains](#)
[Magnetic Fields](#)
[Electromag. Fields](#)
[Field From a Coil](#)
[Mag Properties](#)
[Hysteresis Loop](#)
[Permeability](#)
[Field Orientation](#)
[Magnetization of Mat'l's](#)
[Magnetizing Current](#)
[Longitudinal Mag Fields](#)
[Circular Mag Fields](#)
[Demagnetization](#)
[Measuring Mag Fields](#)

Equipment & Materials

[Portable Equipment](#)
[Stationary Equipment](#)
[Multidirectional Equipment](#)
[Lights](#)
[Field Strength Indicators](#)
[Magnetic Particles](#)
[Suspension Liquids](#)

Testing Practices

[Dry Particles](#)
[Wet Suspension](#)
[Magnetic Rubber](#)
[Continuous & Residual Mag](#)
[Field Direction & Intensity](#)
[L/D Ratio](#)

Process Control

[Particle Concentration](#)
[Suspension Contamination](#)
[Electrical System](#)
[Lighting](#)
[Eye Considerations](#)

Example Indications

[Visible Dry Powder](#)
[Fluorescent Wet](#)

Quizzes

Steps in performing an inspection using dry particles

Prepare the part surface - the surface should be relatively clean but this is not as critical as it is with liquid penetrant inspection. The surface must be free of grease, oil or other moisture that could keep particles from moving freely. A thin layer of paint, rust or scale will reduce test sensitivity but can sometimes be left in place with adequate results. Specifications often allow up to 0.003 inch (0.076 mm) of a nonconductive coating (such as paint) and 0.001 inch max (0.025 mm) of a ferromagnetic coating (such as nickel) to be left on the surface. Any loose dirt, paint, rust or scale must be removed.

Apply the magnetizing force - Use permanent magnets, an electromagnetic yoke, prods, a coil or other means to establish the necessary magnetic flux.

Dust on the dry magnetic particles - Dust on a light layer of magnetic particles.

Gently blow off the excess powder - With the magnetizing force still applied, remove the excess powder from the surface with a few gentle puffs of dry air. The force of the air needs to be strong enough

to remove the excess particles but not strong enough to dislodge particles held by a magnetic flux leakage field.

Terminate the magnetizing force - If the magnetic flux is being generated with an electromagnet or an electromagnetic field, the magnetizing force should be terminated. If permanent magnets are being used, they can be left in place.

Inspect for indications - Look for areas where the magnetic particles are clustered.

 **Back****Next** 