Wet Suspension Inspection

Wet suspension magnetic particle inspection, more commonly known as wet magnetic particle inspection, involves applying the particles while they are suspended in a liquid carrier. Wet magnetic particle inspection is most commonly performed using a stationary, wet, horizontal inspection unit but suspensions are also available in spray cans for use with an electromagnetic yoke. A wet inspection has several advantages over a dry inspection. First, all of the surfaces of the component can be quickly and easily covered with a relatively uniform layer of particles. Second, the liquid carrier provides mobility to the particles for an extended period of time, which allows enough particles to float to small leakage fields to form a visible indication. Therefore, wet inspection is considered best for detecting very small discontinuities on smooth surfaces. On rough surfaces, however, the particles (which are much smaller in wet suspensions) can settle in the surface valleys and lose mobility, rendering them less effective than dry powders under these conditions.

Steps in performing an inspection using wet suspensions

Prepare the part surface - Just as is required with dry particle inspections, the surface should be relatively clean. The surface must be free of grease, oil and other moisture that could prevent the suspension from wetting the surface and preventing the 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 suspension - The suspension is gently sprayed or flowed over the surface of the part. Usually, the stream of suspension is diverted from the part just before the magnetizing field is applied.
Apply the magnetizing force - The magnetizing force should be

applied immediately after applying the suspension of magnetic particles. When using a wet horizontal inspection unit, the current is applied in two or three short busts (1/2 second) which helps to improve particle mobility.

Inspect for indications - Look for areas where the magnetic particles are clustered. Surface discontinuities will produce a sharp indication. The indications from subsurface flaws will be less defined and lose definition as depth increases.

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