Met-L-Chek®

PENETRANT PROFESSOR APPROVED

GENERAL GUIDE to Magnetic Particle Materials

GENERAL INFORMATION

Magnetic particle inspection is used to locate discontinuities on or near the surface of ferromagnetic materials. A magnetic field is induced in the part to be examined. Discontinuities at or near the surface will cause the magnetic field to concentrate at any discontinuity. Fine magnetic particles are attracted to the magnetic field leakage over the discontinuities forming indications or mapping the discontinuities. Considerable theory, technical training, specialized equipment and trial and error is involved for effective magnetic particle inspection.

PARTICLES

There are two types of materials generally used for magnetic particle inspection, wet method and dry method. Dry method materials are primarily used in weld inspection. Production and overhaul situations require high sensitivity, broad area detection capability exhibited by the wet method. Wet method particles are generally smaller than dry method particles and are more easily attracted to weaker leakage fields. The particles are suspended in a liquid carrier fluid which facilitates the mobility of the particles on the part surface. The particles may be visibly colored relying on contrast with the base material or contrast coating for detectability or they may be fluorescent and produce brilliant indications under UV-A illumination. Fluorescent inspection requires the inspection area be darkened to ensure detection of the fluorescent indications.

CONTINUOUS METHOD

Wet method materials may be used with **AC**, **HWDC**, or **FWDC** magnetizing currents. In all three the application of the bath begins and ends before the current shot is ended to insure maximum field strength during bath application. Bath application after the current shot may reduce sensitivity by washing off weakly held particles. Generally **AC** or **HWDC** is used with dry method particles.

BATH

Special petroleum based carrier fluids or water ,which has been treated with conditioning agents, may be used as the wet method particle bath media. The bath must be continuously agitated during use as the dense particles will settle out of solution upon standing. Materials intended for water bath use should not be placed in equipment that has been used for oil bath applications until the tank and all plumbing have been thoroughly cleaned. Similarly water or wet parts should not be introduced to baths with oil carriers as this will cause the particles to cling to the tank and agglomerate. The particle concentration must be maintained for maximum performance. The settling volume per **ASTM E-1444** should be between **0.1** and **0.4 ml/100ml**. for **fluorescent** particles after 60 minutes in oil and 30 minutes in water and between **1.2** and **2.4 ml/100ml** for **visible** particles.

SPECIFICATIONS

The Met-L-Glo series of wet method magnetic particle materials are formulated to meet or exceed the requirements of the most widely used magnetic particle inspection specifications.

AMS-2641
AMS-3042
AMS-3044
AMS-3045
AMS-3046

ASTM E-709
ASTM E-1444

ASME B & PV Code, Sec. V, Article 25

BS-5044
BS-4069

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