Magnetic Particle Testing Classroom Training Book

Text Corrections

The following text corrections apply to the first through third printings of the *Magnetic Particle Testing Classroom Training Book.* The fourth printing of this publication has incorporated the corrections into the published text.

Page 27: The fifth sentence should be deleted: ~~The other contact head is fixed; the contact plate on it, being air-cylinder operated, provides a means for clamping the test object.~~

Page 34: The first sentence should be changed to: "Magnetic particle testing is a method of nondestructive testing that uses very small ferromagnetic particles …"

Page 37: The second sentence should be changed to: Magnetic flux lines flow through the bar from the south pole to the north pole, with the flux density uniform along the bar.

Page 49: The first sentence of the second paragraph should be changed to: Particle sizes are very small, ranging from about 50 to 150 µm (0.002 to 0.006 in.) for dry particles and from 5 to 15 µm (0.0002 to 0.0006 in.) for sensitive wet technique particles in commonly used formulations.

Page 53: Under "Residual Method," the second sentence of the first paragraph should be deleted: ~~The residual method is used only when test objects are magnetized with direct current.~~

Page 54: The first sentence of the last paragraph should be deleted: ~~Most magnetic particle indications produced using the residual method appear quickly on a test object.~~

Page 55: The first two sentences should be replaced with: If there is not enough residual magnetism to perform a magnetic particle test using the residual method, the technician must resort to testing of the object(s) using the continuous method.

Page 55: The second sentence of the last paragraph should be changed to: The residual method is capable of close control~~, and of giving uniform results to a greater degree than the continuous method~~.

Page 62: Under "Direct Contact," the second sentence should be replaced with: When passing current directly through the part, the testing amperage should be 300 to 800 A per inch of diameter (12 to 32 A/mm) if the test object is reasonably uniform and cylindrical in shape.

Page 63: The first paragraph should be changed to: … In the case of a centrally located conductor, amperage requirements may range from 100 A per inch (4 A/mm) of hole diameter to as much as 1000 A per inch (40 A/mm), depending on test object material and the nature of the suspected discontinuities. The strongest flux field is present at the part's inside surface where the central conductor is located. Keep in mind that the magnetizing field strength on the inside surface of a part decreases as its distance away from the central bar conductor increases.

Page 64: Under "Cable Wrap," the last sentence of the second paragraph should be changed to: ~~Twisting or taping~~ Uniformly wrapping the coil cable leads together aids in ~~reducing the losses of the coil circuit~~ preventing distorted magnetic fields in test parts.

Page 65: In the last paragraph, the phrase "rules of thumb" should be replaced by the term "standards" in both instances.

Page 146: Under "Material Contamination," item #5 should be changed to: … Acids react with the magnetic particle bath to destroy the fluorescence of the ~~dye stuffs~~ pigmented material, even when present in fairly small quantities.

Page 147: The paragraph under "Heat Degradation" should be replaced with: Fluorescent pigments are sensitive to elevated temperatures. The elevated temperatures can cause a decrease in fluorescent brightness and allow the particles to clump together. This agglomeration of particles will cause a major decrease in effectiveness. Care should be exercised in the storage of magnetic particle materials to avoid extreme temperatures.

Page 147: Under "Material Control Requirements," item #2 should be changed to: Perform fluorescent ~~dye~~ pigment separation check.

Page 148: The paragraph under "Use of the Settling Test" should be replaced with: The settling test is intended to measure the concentration of magnetic particles in a suspension. Bath concentration and, at times, bath contamination are determined by measuring the settling volume through the use of a pear-shaped centrifuge tube. The volume that settles out at the bottom of the tube is indicative of the particle concentration in the bath. Precautions include demagnetizing the settling tube, conducting the test in an area free from vibration and positioning the tube in a location where strong magnetic fields are absent.

Page 148: Under "Ultraviolet Radiation and Facilities," the list should be replaced with:

1. The UV-C range (short ultraviolet radiation) is considered to be between 180 and 280 nm.
2. The UV-B range (medium ultraviolet radiation) is considered to be between 280 and 320 nm.
3. The UV-A range (long ultraviolet radiation) is considered to be between 320 and 400 nm. This UV range is used for fluorescent magnetic particle examination.

Page 148: In the last paragraph, the terms “dye” and “dyes” should be replaced with “pigment” and “pigments,” respectively.

Page 149: The last full sentence should be changed to: At this level, the intensity of ultraviolet radiation striking the test object surface should not be less than ~~800~~ 1000 mW/cm2.

Page 150: Under “Ambient Light Meters,” the first paragraph should be changed to: The measurement of visible light is accomplished by using ~~selenium cell photometers~~ silicon photodiodes. ~~The selenium cell is photosensitive and responds to electromagnetic energy with wavelengths of about 380 to 450 nm.~~ Visible light meters must have filters to limit the meter response to the 400 to 760 nm range. ~~This range extends into the longer wavelength ultraviolet radiation and shorter wavelength visible ranges. Precise measurement is possible with filters that exclude ultraviolet and infrared radiation. Filters are not normally used since the variation is within acceptable limits.~~ The units of measurement are footcandles or, in SI, lumens, where one footcandle equals one lumen. Another term often used is lux, which equals one lumen per square meter. The commonly used conversion factor is 10.76 lux equals 1 lumen or footcandle.

Page 150: Under “Ambient Light Meters,” last paragraph should be replaced with: All ultraviolet measuring devices are selective and their sensitivity depends upon the wavelength of the radiation being measured. The UV-A meter must have a filter system to produce the maximum response at 365 nm (the wavelength used by magnetic particle pigments to produce fluorescence).

Page 159: The following glossary entry should be changed, as noted:

> **Fluorescent magnetic particle testing:** The magnetic particle testing process using a finely divided fluorescent ferromagnetic testing medium that fluoresces when activated by ultraviolet radiation of ~~320 to 400~~ 365 nm.

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