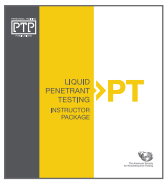

Liquid Penetrant Testing Lecture Guide second edition

Errata – 1st printing 04/19

The following text correction pertains to the second edition of *Liquid Penetrant Testing Lecture Guide*. Subsequent printings of the document will incorporate the corrections into the published text.

The attached corrected page applies to the first printing 04/19. In order to verify the print run of your book, refer to the copyright page. Ebooks are updated as corrections are found.

Page	**Correction**
41	Under Light Meters, number 2, the unit of measurement should be $\mu W/cm^2$.
70	Under Twin Nickel-chromium Sensitivity Panels, item number 3 should read "Panels have crack depths of 10, 20, 30, and 50 µm."

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Subdued White Light Inspection

1. Improved penetrant materials have made it possible to test in less than total darkness.
2. Medium to large indications can be detected under fairly high ambient (white) light.
3. Fluorescent testing is possible outdoors.
4. Ambient (white) light requirements must be met using black cloth or other shielding.

Light Meters

1. White light sensors measure in footcandles or lux.
2. Ultraviolet radiation sensors measure in microwatts per centimeter squared ($\mu W/cm^2$).

Materials For Liquid Penetrant Testing

Materials used in liquid penetrant testing include:

- penetrants
- emulsifiers
- removers
- cleaners
- developers

Precleaning and Post-cleaning Materials

1. Materials must be compatible with the penetrant.
2. Manufacturers will recommend an approved cleaner for their products.

Water-washable Penetrants

1. Highly penetrating, oily liquids containing a built in emulsifying agent that renders the oily media washable with water.
2. The simplest to use are visible penetrants or color contrast penetrants, because no fluorescent lighting is required.
3. Greater visibility is obtained if fluorescent penetrants are used and viewed under ultraviolet radiation.

Postemulsifiable Penetrants

1. Postemulsifiable penetrants are available as either visible or fluorescent penetrants.
2. These penetrants have the advantage of eliminating some of the danger of over rinsing.

Twin Nickel-chromium Sensitivity Panels

1. A set of two nickel-chromium (NiCr) panels, each measuring 3.9 × 1.4 in. (10 × 3.5 cm) is sheared from the same stock.
2. This allows for matching crack patterns, so that a simultaneous comparison of two penetrant materials can be achieved.
3. Panels have crack depths of 10, 20, 30, and 50 µm.

Stainless Steel Test Panels

1. Used to test the washability of fluorescent penetrants and visible dye penetrants.
2. Panels are prepared from annealed type 301 or 302 stainless steel and measure 2 × 4 in. (5 × 10 cm) or larger.
3. Panels are sandblasted on one side with 80 mesh average size grit, at 60 psi (414 kPa), with the gun held approximately 18 in. (46 cm) from the surface.

Stainless Steel Test Panel Usage

Before use, the panels are cleaned by degreasing, heated to 160 °F (71 °C), and then allowed to cool to room temperature in a dry area.

Low Cycle Fatigue Blocks

1. Titanium or nickel-chromium-iron (NiCrFe) plates are commonly used to manufacture standards with low cycle fatigue (LCF) block cracks in various size ranges.
2. The cracks are started from electrical discharge machined (EDM) notches or spot welds, which are later ground away after the starter cracks are grown.
3. Tensile stressing or reverse bending of the plates achieves additional crack length extension.
4. Titanium or NiCrFe plates are commonly sold in a set of three plates, with a total of 18 possible cracks in the set.

Low Cycle Fatigue Blocks Usage

1. Low cycle fatigue (LCF) LCF blocks are used like other known discontinuity standards, except that the total number of detected cracks per inspection of the plate set is recorded and monitored in a running summary per procedure supplied with the plates.
2. When fewer cracks are detected, the technician is warned that something has shifted in the process capability, or that the cracks have been improperly cleaned.