DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Transportation Laboratory
5900 Folsom Boulevard
Sacramento, California 95819-4612

METHOD OF TEST FOR HOLIDAY DETECTION IN EPOXY-COATED REINFORCING STEEL PRODUCTS

A. SCOPE

This test method describes the procedure for determining holidays in epoxy coatings on ferrous materials. This method uses an electrical current that flows through a low resistance path and triggers an alarm (buzzer) when a holiday is detected.

Holidays are defined as pinholes and voids in non-conductive coatings that allow current to pass through the protective coating to the metal base material. These discontinuities may not be visible to a person with normal or corrected vision.

B. REFERENCES

ASTM A 775/775M – Epoxy-Coated Steel Reinforcing Bars
ASTM A 884/884M – Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A 934/934M – Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM G 62 – Methods for Holiday Detection in Pipeline Coatings
Caltrans Standard Specifications Section 50, “Prestressing Concrete“
Caltrans Standard Specifications Section 52, “Reinforcement”

C. APPARATUS

1. A low voltage holiday detector tester having an electrical source of 67.5 to 100 V DC in accordance with ASTM G 62 Section 1.2, Method A. Example: Tinker & Rasor, Model M/1 Holiday Detector.

2. A cellulose sponge with an insulated handle. The sponge is wired to the positive contact electrode.

3. A grounding clamp/magnet and wire to the negative (ground) terminal. This provides the system connection to the low resistance base metal.

4. Ordinary tap water if measuring pin holes and voids in coating thickness up to 10 mils.

5. A non-sudsing type wetting agent. Use the following dilution factor for measuring pin holes and voids in coating thickness up to 20 mils: One ounce agent to one gallon of tap water. Reference: Tinker & Rasor Water-Wetter.

6. An 80,000-ohm, ½-watt resistor mounted on an insulated terminal board for checking proper audio indication and the drop in battery voltage with this resistance load. (This test resistance may be built in to newer models of the holiday tester.)

D. SAMPLES

1. Sample coating shall be dry and free from contamination before holiday testing.

E. PROCEDURE

Wet the sponge with sufficient wetting solution to assure moisture penetration of any defect in the surface coating. Squeeze out any excess.

1. Before starting the testing process, place the moist sponge on one end of the 80,000-ohm resistor and place the magnet contact on the other end. Verify that an audible alarm is given. Weekly, check the voltage (with a high impedance volt/ohm meter) across the tester terminals when the system is loaded with the 80,000-ohm resistor. If the voltage less than 90 % of required voltage, replace the system battery.

2. If the sample bar ends are coated, grind the coating off one end of the bar being tested. This is for the ground contact.

3. Place the magnet with the attached ground wire on the bare end of the bar. The magnet should be in direct contact with the base metal.

4. Test the connections by contacting the bare end with the sponge. The audible alarm should be triggered.

5. Test the coated metal sample by sweeping the moist cellulose sponge up and down the deformation sides and the ribbed sides of the sample. The sweep rate shall not exceed 2½ inches per second. Count the alarm indications, mark the spots (See Precautions 2) and record the total number detected.

F. REPORTING OF RESULTS

Document results of tests with appropriate comments and notations on a test form (example of an appropriate form is shown in Figure 1). Report results in formal form (as complying or not complying with specifications) on a sample testing form (sample of an example is shown in Figure 2). The sample will be documented with the inspector's or the coater's name and lot number, the date sampled, the required specification, and the number of holidays found.

G. PRECAUTIONS

1. Ensure that the sponge is in full contact with the surface of the bar to accurately detect all holidays.

2. Mark all detected holidays on the bar with an indelible marker to ensure an accurate count.

3. Skinned or damaged spots caused by shipping and handling are not to be counted as holidays.

4. Follow manufacturer's instructions for adjusting the electronic circuit to sound at 80,000-ohms across the terminals.

H. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf

End of Text
(California Test 685 contains 5 pages)

Figure 1. Test Form for Recording Holiday Detection Results

California Test 685 - Holiday Detection Results

Standard Specs: 52-1.02B
ASTM: A775/A934
Holiday Detection:
Criterion for passing = less than 1 holiday per foot.

SM No.: 03-1601

TL 101 No.: C900348

Date Received: 9/21/04

Date Tested: 9/22/04

Operator: BRIAN WU

Lot No.: B6031

Contract No.: 14-618344

Epoxy Color: (Purple) Gray Green

No. of Bars: 4

Bar ID: 57

Length: 2.5 ft

Lot/Load/Release No.: 0916, FT, WT

Holiday Detection Equipment Calibrated? (Yes) No

No. of Holidays Detected: 1

Holidays/Foot: <1

Results: (Pass) Fail

Figure 2. Sample Test Report

State of California
Department of Transportation

Structural Materials Testing Laboratory
5900 Folsom Boulevard, Sacramento, CA 95819

TEST REPORT

A2LA ACCREDITED
TESTING CERT # 2364.01

Remarks ref: Standard Specifications (52-1.02B); ASTM A934; TM 07. Heat #SE13101901, SE13101318. Load 99.

Sample No: SM-13-0701
Date Sampled: 06/05/13 **Date Rec'd:** 06/10/13 **Date Reported:** 06/13/13
Lot No: B3136513 **TL-101 / SIC No:** C646189
Contract/Permit No: 02-3E7604
Material: A934 #6/19mm Purple Epoxy Coated Rebar.
Manufacturer: Farwest Steel Reinforcing
Sampler: Dennis Combs

Results: **SAMPLE(S) SUBMITTED COMPLY WITH SPECIFICATIONS**

Note: Results relate only to the items tested