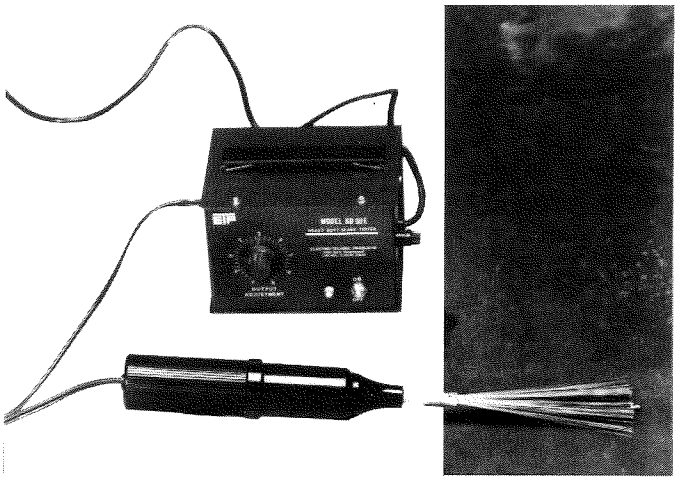
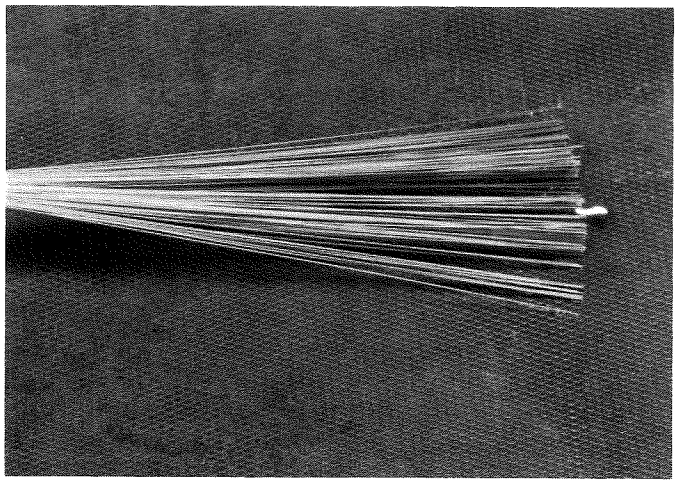


Spark testers, such as this Electro-Technic BD50-E, are used to find leaks in tank linings.



A bright white spark identifies a pinhole in the lining.

High Voltage Used to Leak-Test Tank Linings

HIGH-VOLTAGE spark testers have been used for years to leak-test cargo tank linings, and HM-183 requires the use of spark testers on tank trailers in corrosive service.

Linings for corrosive service cargo tanks are usually ⅛-inch- to ¼-inch-thick rubber. The linings are manufactured by firms specializing in the business, and many companies install the linings to meet customer specifications.

Problems with rubber linings come from three sources: the manufacturer, the installation process, and the age of the vessel.

Before a lining test, the cargo tank must be degassed and dried. Proper drying can take up to two hours. When performing a leak test, safety procedures in the National Tank Truck Carriers maintenance manual must be followed. When a lining inspector is inside a tank, another employee must be present outside at the manhole to assist in an emergency.

Directions for test methods are found in HM-183 Sec 180.407. The rules require annual testing of the lining in tanks with a high-frequency spark tester that can produce voltage sufficient to ensure proper calibration; use of a probe with an L-shaped 3/32-inch wire with up to a 12-inch bottom leg or equally sensitive probe; and use of a steel calibration block with a known leak, equivalent to a puncture caused by a 22-gauge hypodermic needle, lined with the same materials as those to be tested.

According to the rules, the probe shall be passed over the surface of the calibration block in a constant uninterrupted manner until the leak is found. Leaks are detected by white or light-blue sparks.

A leak-free lining causes dark-blue or purple sparks. Rules require voltage to be adjusted to the lowest setting that will produce a minimum ½-inch spark measured from the top of the lining to the probe. The spark tester is to be calibrated using a test calibration block, the same power source, probe, and cable length to assure the setting on the probe is unchanged.

Problems with rubber linings come from three sources: the manufacturer, the installation process, and the age of the vessel.

The spark tester must be calibrated to detect short perpendicular holes and longer, oblique holes including the air space between the tester-tip and the rubber lining. While the tester-tip touches the surface of the lining, contact is not always maintained. Many leaks also are found in seams, where the rubber lining abuts other pieces.

These areas require a high-voltage setting that will produce a minimum ½-inch spark. At least 34kv is needed to produce a ½-inch spark through short through-thickness holes and longer oblique holes.

Using the maximum voltage will produce a longer spark and is not destructive to the lining. Watch for the bright white spark; mark the hole with chalk for later repair. Thin films and coatings must be tested with caution. Failure of thin coatings can be caused by the thermal and mechanical effects of high voltages.

Rubber linings are not damaged by spark testers. Tests by researchers at Northwestern University found that normal usage of spark testers on ⅛-inch and thicker rubber sheets does not cause dielectric breakdown.

Creating holes in rubber linings while spark testing is unlikely because of the brief time the spark tester tip is over any part of the lining. Spark testing will not cause holes in good linings, but if an air bubble is underneath the lining, the spark tester will puncture it, exposing a cavity. Most lining inspectors want to find this kind of hidden hole because it will leak, but if there is a pinhole in the lining a spark tester may enlarge it.

For more information, contact Electro-Technic Products Inc, 4642 N Ravenswood Ave, Chicago IL 60640-4592. □

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