

INSTALLATION AND TESTING PROCEDURES FOR ERM LEAK DETECTION

1. Materials & Equipment

MATERIALS BY THERMACOR:

1. Analog Ohmmeter (See Schematic Below)
2. Wire Crimpers
3. Jumper Wire with Crimps-or-crimps

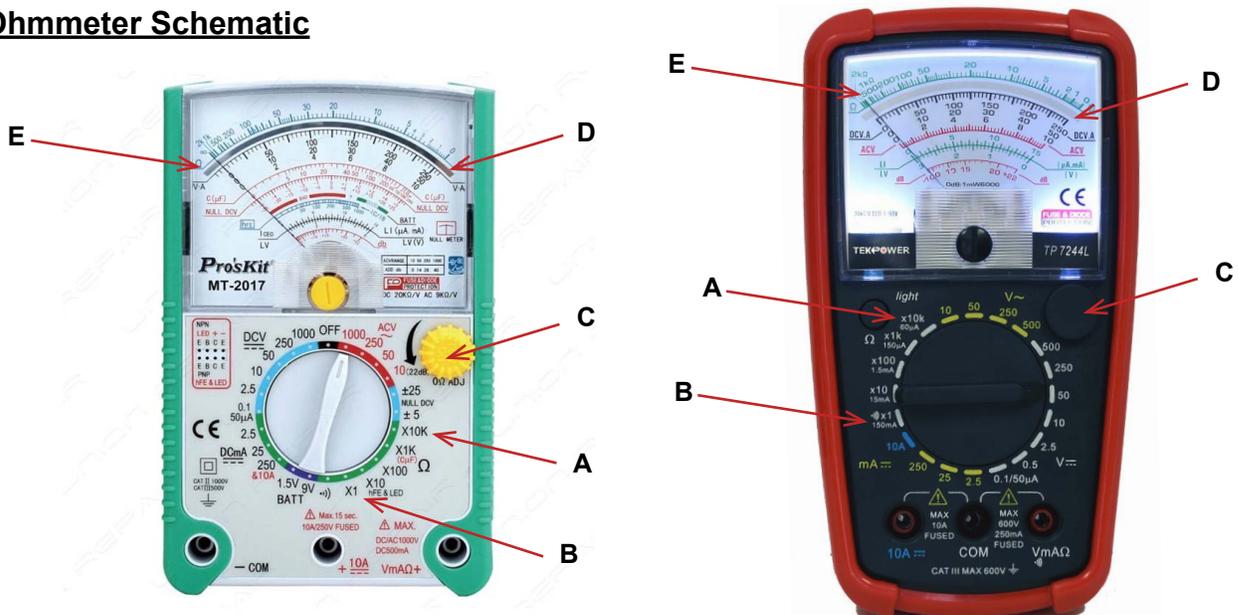
EQUIPMENT PROVIDED BY CONTRACTOR:

1. Propane Tank
2. Torch
3. Sandpaper (80 grit)

2. Definitions

- a) **Isolation Test:** Test to confirm the leak detection wire is not in contact with the steel carrier pipe or any conductive components.
- b) **Continuity Test:** Test to confirm the leak detection wire is not broken within the insulation.
- c) **Ohmmeter Calibration:** With the ohmmeter leads in contact, using the adjuster knob to set the needle to the 0 Ω location. Calibration must be performed before each reading.
- d) **Resistance Reading:** Number indicating the resistance of the circuit. Calculated taking the multiplier as indicated on the dial and multiplying it by the number the needle is pointing to on the display. i.e., if the dial is set to 10K ACV and the needle shows 20, the Resistance Reading will be 20 x 10,000 or 200,000 Ω .
- e) **Foam Drying:** Using a light billowy flame to remove any residual moisture from the surface where the wire exits the foam.

3. Ohmmeter Schematic



- A) **Isolation Test Setting- Select Largest Multiplier (x10k; x100k)**
- B) **Continuity Test Setting- Select Smallest Multiplier (x1)**
- C) **Ohmmeter Calibration Knob**
- D) **Lowest Resistance Location**
- E) **Highest Resistance Location**

4. Delivery Testing

A) Continuity Test- Each piece of pipe, as it arrives at the jobsite, must be checked for continuity and isolation.

i) Ohmmeter Setting

(1) The dial on the ohmmeter should be set to the **LOWEST** resistance setting as indicated in the ohmmeter schematic.

ii) Calibrate Ohmmeter as outlined in Definitions.

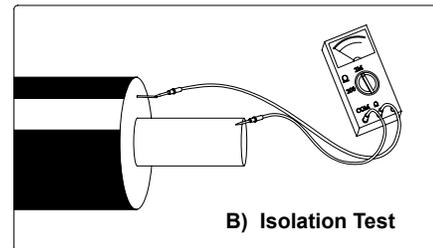
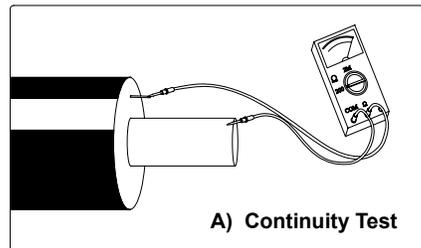
iii) Test Continuity of wires

(1) Single Wire

(a) Using the sandpaper, remove any debris or mil lacquer from a location on the pipe. Touch the black lead from the ohmmeter to the prepared surface on the pipe. Touch the red lead from the ohmmeter to the wire. The needle on the ohmmeter should peg to the left of the display, indicated infinite resistance. On the opposite end of the pipe use the sandpaper to remove any debris or mil lacquer from a location on the pipe. Have another person short out the circuit by touching the wire to the pipe. The needle on the ohmmeter should peg to the right, ideally to 0 Ω . Document the resistance reading from the spool on the included form.

(2) Dual Wire

(a) For Dual Wire systems, check both wires independently per Single Wire instructions above.



B) Isolation Test

i) Ohmmeter Setting

(1) The dial on the ohmmeter should be set to the **HIGHEST** resistance setting as indicated in the ohmmeter schematic.

ii) Calibrate Ohmmeter as outlined in Definitions.

iii) Test Isolation between all conductors.

If the resistance is below 1 million Ω on the test, perform Foam Drying

(1) Single Wire

(a) Ensure that the wire at the opposite end of pipe is not in contact with any other conductor. Use the same location on the pipe which was cleaned for the Continuity Test. Touch the black lead from the ohmmeter to the prepared surface on the pipe. Touch the red lead from the ohmmeter to the wire. The needle on the ohmmeter should peg to the left, ideally $\infty\Omega$. Document the resistance reading for the spool on the included form.

(2) Dual Wire

(a) For Dual Wire systems, check both wires per Single Wire instructions above.

(3) Aluminum Diffusion Barrier

(a) For aluminum diffusion barrier test the wire(s) a second time but touch the aluminum diffusion barrier with the black lead from the ohmmeter. This ensures the wire is isolated from the aluminum diffusion barrier in the same way it is isolated from the pipe.

If the Isolation Test on any joint results in resistance readings less than 1M Ω or the Continuity Test results in resistance readings greater than 5 Ω please contact the Factory or your local Thermacor Representative.

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FKII
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5. Installation Testing

Installation testing should only be performed once the entire segment of joints has had the required NDE and testing performed per the project specification.

During Installation it is critical that every time a joint is insulated that the test below are performed back to the beginning of the run. Failure to properly test the entire circuit could result in excavation of the system during Final Run Testing.

a) Pre-Insulation Joint Wire Connection

- i) Locate and clean the end of the leak detection wire by using the sandpaper to remove any oxidation/foam from the wire.
- ii) Using the supplied crimpers, crimp the wire together on both sides of the joint with the included jumper wire or crimps. If the wire is insulated, ensure the crimp occurs on the bare copper, not the insulation.

If the resistance is below 1 million Ω on the test, perform Foam Drying.

iii) Continuity Test

- (1) Perform the Continuity Test as outlined in Section 4.A but check it back to the beginning of the pipe run.

iv) Isolation Test

- (1) Perform the Isolation Test as outlined in Section 4.B but check it back to the beginning of the pipe run.

b) Post Insulation Joint Wire Testing – Once the joint has been insulated per the joint closure instructions, test the leak detection wire again to ensure resistance has not changed after insulation of the joint.

i) Continuity Test

- (1) Perform the Continuity Test as outlined in Section 4.A but check it back to the beginning of the pipe run.

ii) Isolation Test

- (1) Perform the Isolation Test as outlined in Section 4.B but check it back to the beginning of the pipe run.

6. Final Run Testing

Once all the joint closures have been installed, perform a final test of the Run Continuity and Isolation as outlined in Section 4.A and 4.B

7. Required Documentation

As required by the warranty, submit the resistance readings.

- a) Delivery Resistance Testing
- b) Installation Testing
- c) Final Run Testing.

The Leak Detection System on an entire pipe run MUST be tested and verified prior to backfill of any joints. The Isolation Resistance must be greater than 200,000 Ω and the Continuity Resistance should be less than 100 Ω for the entire run.