A. Purpose

This Manual Part recommends instructions which apply to the inspection and test of insulated rail joints and other track insulation and track fittings. They set forth general requirements representing recommended practice.

B. General

1. Insulated rail joints and other track fittings shall be inspected as instructed to determine that they are properly installed and maintained. If found to be damaged, insulation shall be repaired or replaced.

2. Inspection and tests which may interfere with safe operation of trains shall not be started until train movements have been fully protected.

3. When track work is done at a location containing an insulated joint or other track insulation, or when rail ends are heated or welded, the insulation shall be inspected, and if damaged, repaired or replaced.

4. Results of inspections and tests shall be recorded as instructed in accordance with railroad instructions.

5. When installing new joints, electrical measurements should be taken before and after the joints are installed in the track.

6. When inspecting or testing insulated joints or other track insulation in electric propulsion territory, appropriate safety precautions in accordance with railroad instructions shall be taken.
C. **Visual Inspection**

Insulated joints and other track insulation should be visually inspected for the following conditions:

1. The end post is secure and not bridged by lip, flow, sliver of steel or any other conductive materials.

2. Spikes are not driven against and facing the joint bars.

3. Proper rail fasteners are installed correctly and do not bridge the insulated joint.

4. Missing, cracked, worn or broken insulation or bolts.

5. That non-insulated plates do not encroach within 2 in (50.8 mm) of the end post.

6. Ties under joints are in good condition.

7. For evidence of longitudinal rail movement within the confines of the insulated bar area exceeding 3/8 in (9.5 mm).

8. For poly-insulated joints: Insulation is not worn so as to allow bare metal of the bar to make contact with the rail, spike or fastener.
D. Testing

Insulated rail joints and other track insulation may be tested as shown in Figures 8635-2, 8635-3, and 8635-4. When testing insulated joints, consideration should be made for the following conditions which may create erroneous results:

1. Battery or relay in series with the circuit under test.

2. Presence of insulated joint coupler or impedance bond across joint.

3. Poor ballast conditions providing a parallel leakage path across insulated joint.

4. Other failed insulated joint in the vicinity of the joint under test.

E. Test Equipment

1. Commercially available test devices designed for analyzing insulated rail joints and other track insulation may be used as illustrated in Figures 8635-2 and 8635-3. Use of test device and interpretation of measured results should be in accordance with manufacturers’ instructions.

2. A test device may be constructed for analyzing insulated rail joints and other track insulation as shown in Figures 8635-2 and 8635-3. This device shall consist of a dc milliammeter, a 1.5 V dry battery cell, and a 4–ohm to 10-ohm resistance as illustrated in Figure 8635-1. When testing this device (shown as “M” in the drawings) are used for troubleshooting insulated rail joints and other track insulation, track battery, relay, impedance bonds and other rail connections should be disconnected from the circuits to be tested. To determine total reading of an insulated joint, add the higher current value obtained from readings No. 1 and No. 2 to the higher current value from readings No. 3 and No. 4 as shown in Figure 8635-3.
For other than insulated joints, insulation should be renewed when the current value obtained is 0.020 \text{ mA} or higher.

b. For armored insulated joints, when the current value obtained is 0.020 \text{ A20 mA} or higher, the insulated rail joint should be taken apart and rust thoroughly cleaned with a wire brush and defective insulation and insulated bushing renewed.

c. For glued joints and poly insulated joints, when the current value obtained is 0.020 \text{ A20 mA} or higher, the joint should be marked for replacement or further investigation.

**TEST DEVICE**

1.5V 4-10 Ohm

![TEST DEVICE Diagram]

**Figure 8635-1**
Figure 8635-2
Glued and Poly-Insulated Joints

Armored Joints

Figure 8635-3
Notes:

1. Current Method
   
   a. Place a hardwire shunt between points A and D. No change in the ammeter reading indicates joint Y is not leaking current.

   b. Place a hardwire shunt between points B and C. No change in the ammeter reading indicates joint X is not leaking current.

2. Voltage Method
a. Place a hardwire shunt between points A and D. Observe that the voltmeter reading at V1 does not decrease.

b. Place a hardwire shunt between points B and C. Observe that the voltmeter reading at V2 does not decrease.