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SSIT-701 Insulated Track Hardware

Purpose

Track hardware insulation tests and inspections shall be performed to verify the insulation is in good condition and provides the electrical isolation as required by design.

Test Intervals

Track insulation hardware inspections and tests shall be performed when installed, as required, and at least once every six (6) months. Tests shall be performed in dry conditions, unless troubleshooting. Effects of moisture must be considered when testing in wet conditions.

Following any changes of equipment or connections associated with track circuit, track circuit must be both visually and electrically tested and adjusted to confirm proper operation.

Refer to *SSIT-7 Signal System Inspection and Test Intervals* for all test intervals.

Rail Safety

Employee shall ensure the site is safe for employees, the public, vehicular traffic and train operations as defined in *SSIT-8 Protecting Train Operations* prior to performing tests and inspections.

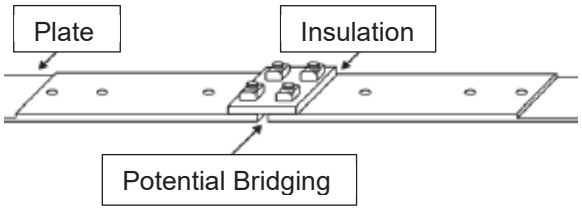
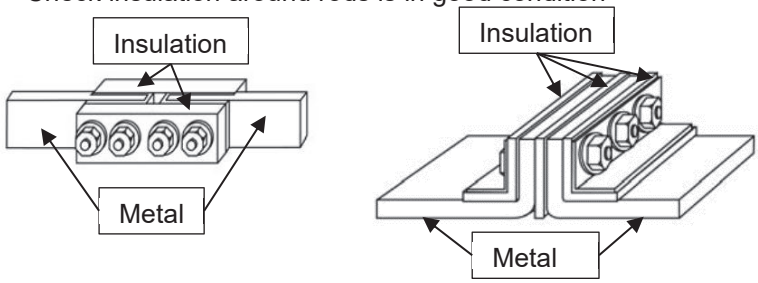
Visual Inspections – Insulated Joints

The following visual inspections are to be performed at each insulated joint. Where inspections indicate breakdown, proceed to Electrical Tests:

Step	Procedure
1. Check Insulated Joint Location	→ Check joints are installed with proper stagger and spacing. Check joint is present and not displaced. → Check joint is not broken or weathered. → Check rail ends are square
2. Check Spikes	→ Check joints are properly spiked. → Check spike heads are reversed if epoxy joint used.
3. Check Tie Clips	→ Check clips are properly installed. → Check proper clips are used. → Check the clips have proper insulated pads and they are installed properly.
4. Check Plates & Ties	→ Check ties are properly spaced → Check no steel ties or plates are used under insulated joint rail ends.
5. Check Insulation	→ Check insulating material is not burnt. → Check end-post space is not bridged by rail run-over. → Check end-post space is not bridged with filings or slivers
6. Check Bolts	→ Check bolts are properly installed and secure.
7. Check Tamping	→ Check ties are properly tamped. → Check for excessive pumping action of joint and ties when train passes (if possible).
8. Check Epoxy Joints	→ Check epoxy joints are not burnt or melted.

Visual Inspections – Insulated Track hardware

The following visual inspections are to be performed at each location where insulated track equipment is installed (i.e.gauge rods, gauge plates, front rods, throw rods, etc.). Where inspections indicate potential breakdown, proceed to Electrical Tests:

Step	Procedure
1. Check Insulation	→ Check insulating gaskets, ferrules and bolts are secure and in good condition. → Check joint is present and not displaced. → Check joint is not broken or weathered. → Check insulating material is not burnt.
2. Check for Bridging	→ Check there is separation between rail and cross ducts. → Check rods, plates, pipelines and ducts are not bridged with filings or slivers. 
3. Check Switch and Gauge Rods	→ Check insulation around rods is in good condition 
4. Check Tie Clips	→ Check clips are properly installed. → Check proper clips are used. → Check the clips have proper insulating pads.
5. Check Bolts	→ Check bolts are properly installed and secure.

Electrical Tests (Voltage) – Insulated Joints

The following electrical test is to be performed at insulated joints at time of installation and whenever joints show visual indication of breakdown. Test procedure to be followed when a DC voltmeter is used:

Step	Procedure
1. Check Track Occupancy	→ Check the track is not occupied prior to testing.
2. Obtain Meter Reading	• Connect DC voltmeter between the rails and note voltage reading.

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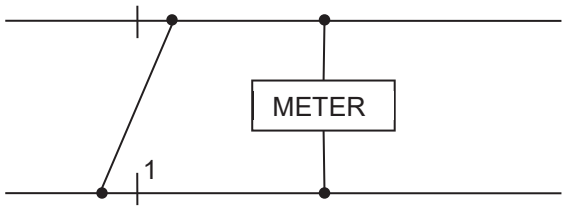
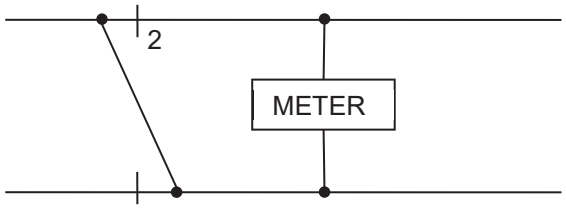
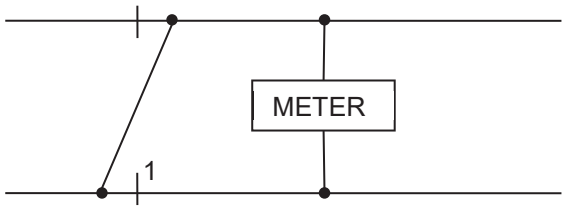
Step	Procedure
3. Check First Insulated Joint	• Place 0 ohm shunt as shown below:  **If voltage decreases:** Insulated joint 1 has leak and requires repairs or replacement.
4. Check Second Insulated Joint	• Place 0 ohm shunt as shown below:  **If voltage decreases:** Insulated joint 2 has leak and requires repairs or replacement.

Electrical Tests (Current) – Insulated Joints

The following electrical test is to be performed at insulated joints at time of installation and whenever joints show visual indication of breakdown. Test procedure to be followed when an ammeter is used:

Step	Procedure
1. Check Track Occupancy	→ Check the track is not occupied prior to testing.
2. Obtain Meter Reading	• Connect ammeter between the rails and note current or voltage reading.
3. Check First Insulated Joint	• Place 0 ohm shunt as shown below:  **If current value increases:** Insulated joint 1 has leak and requires repairs or replacement.

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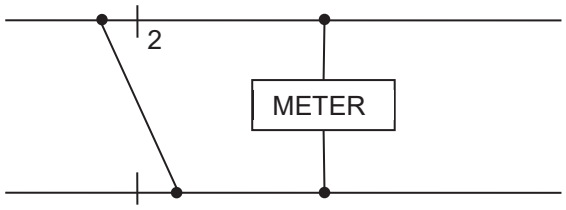
4. Check Second Insulated Joint	• Place 0 ohm shunt as shown below:  **If current value increases:** Insulated joint 2 has leak and requires repairs or replacement.

Electrical Tests – Insulated Track Components

The following electrical test is to be performed on insulated track components at the time of installation and whenever visual inspection of the insulation indicates imminent breakdown:

Step	Procedure
1. Clean Contact Location	• Remove rust and dirt from surfaces to be tested.
2. Check Insulation with Ammeter	• Place a multimeter on continuity check mode. • Connect a lead on each side of insulation to verify isolation. **If continuity detected:** Insulation has leak and requires repairs or replacement.
3. Check Air Gaps with Ammeter	• Place a multimeter on continuity check mode. • Connect a lead on each piece of equipment (i.e. rail and duct) to verify isolation. **If continuity detected:** Air gap not providing isolation. Equipment requires insulation or replacement.

Record Test Results

Record the test results for each insulated component tested:

Step	Procedures
1. Update Log Book	• Add any notes of issues observed, or adjustments made.
2. Complete Test Form	• Record the test as completed on SSIT test form.