IMPEDEANCE BOND PRODUCT SHEET
For Railway Transportation Systems

Why Choose Noratel?
We are well recognized and established as a reliable and quality supplier in the rail and transit systems industry.

We are an ISO 9001 registered company, and understand customer requirements. We strive to provide quality products that meet or exceed expectations.

We offer competitively priced products and outstanding lead-times.

From design to delivery, customer satisfaction is #1 - Only Noratel’s culture of teamwork, ethics, and modern technology can deliver results unlike any other competitor in the industry.

Features

- Impedance Bonds are built to meet the stringent mechanical and electrical requirements of AREMA, Communications & Signal Manual. They are tuned or un-tuned with capacity of up to 2,500 Amps per rail

- Our Impedance Bonds are made of high quality material, ruggedly constructed & adhering to IP57 and have been in service for various transit systems since 2000

- Impedance will drop <10% with a maximum traction current unbalance of 12%

- A 1500 Amps Impedance Bond used for traction current is capable of sustaining a surge of 3000 Amps per rail up to 15 minutes or 10,000 Amps for 1 minute

- Compatible with current requirements of DC propulsion current without interfering with the function of track circuits

- The core nucleus is fabricated from silicon steel with C-4 coating on both faces. The insulators used are class H 350°F minimum (220°C), sufficient for even the most severe conditions

- The bonds are filled with petrolatum to provide protection from moisture, corrosion, and to aid in cooling
**What is an impedance bond?**

The Impedance Bond enables transmission of reverse catenary, heating, or auxiliary current over the insulated rail joints from one track section without interfering with the functioning of adjacent track.

Most railroads use track circuits to determine the location of trains. Tracks are divided into insulated blocks that have separate electric circuits (AC current). If a train is present, the wheels connect two tracks and short out the circuit.

Impedance bonds are used to connect the insulated tracks to allow the passage of DC traction current but not the AC signal used for locating purposes.

Electrical impedance is the frequency dependent measure of the voltage-to-current ratio that determines how much AC current can flow for a given voltage.

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### Noratel Impedance Bond - Standard Part Numbers*

<table>
<thead>
<tr>
<th>Noratel Part No.</th>
<th>Amps / Rail</th>
<th>Resistance (mΩ)</th>
<th>Impedance (Ω) at Freq (Hz)</th>
<th>Dimensions (Inches)</th>
<th>Weight (Lbs)</th>
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</table>

*Custom designs available  (X) Tuned at frequencies specified by customer

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### Typical Characteristics

- **Operating Current:** 1500A
- **Maximum Current:** 15 Minutes @ 3000 A, 1 Minute @ 10,000 A
- **Hipot Test:** 3000V, 60Sec, 60Hz
- **Environmental:** Top of the coolant does not exceed 90°C
- **Ambient temp:** 50°C
- **Finish:** Grey Iron casting with powder coated, black interior and exterior
- **Cover:** Cast Iron powder coated cover to protect terminals
- **Easy for installation, inspection & connection**
- **DC Resistance:** <0.50mΩ @ 20°C
- **Impedance:** 0.51Ω @ 1-5V 60Hz, 0.85Ω @ 1-5V 100Hz
- **Insulation Resistance:** >100MΩ