The NABLA EVOLUTION Fastening System offers improved electrical insulation and lateral force absorption. The unique use of glass reinforced material in the lateral insulator also offers increased mechanical strength.

The NABLA EVOLUTION Fastening System utilises the principal characteristic of the NABLA System that has been proven in installations for several decades. It enables simple installation and maintenance and has improved performance in tight radius curves as it maintains the track gauge and therefore increases significantly the life expectancy of the assembly components.

Components:
1. NABLA blade
2. GS screw
3. Insulators
4. Pad
5. GS anchoring dowel (not shown)

Find more information about the NABLA range at Pandrol.com
FEATURES OF ASSEMBLY

LATERAL FORCE ABSORPTION
Enhanced lateral restraint in curves compared to standard NABLA through insulator / bush combination.

ELECTRICAL INSULATION
Higher electrical insulation than standard NABLA, complies with European CEN Standards.

INSTALLATION
The NABLA EVOLUTION Fastening System has been installed in France ("Plan Rail Auvergne") in order to sustain the track in the Massif Central. This contains many lines with tight curves (200m). The system has also been largely used in tram applications, for ballasted track or slab track with concrete sleeper.

CONTACT TIGHTENING
The NABLA coach screw provides a large acceptable torque range of between 250 and 400 Nm. Toe load is achieved automatically once the screw is tightened to contact.

HIGH PERFORMANCE DOWEL
The NABLA GS dowel transfers loads to the concrete efficiently.
Tightening by contact, for the consistency of the application force on the rail foot

Typical lateral adjustment of +/- 7.5 mm

Improved performance in low radius curves giving control of rail movement and track gauge

### Application data

<table>
<thead>
<tr>
<th>Application data</th>
<th>Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail inclination</td>
<td>Provided in the sleeper as required</td>
<td></td>
</tr>
<tr>
<td>Pad type</td>
<td>Rubber or polyurethane material, depending on stiffness requirements</td>
<td></td>
</tr>
<tr>
<td>Typical applications</td>
<td>Tram, LRT/Metro, Main Line, High Speed</td>
<td></td>
</tr>
<tr>
<td>Clip type</td>
<td>NABLA blade</td>
<td></td>
</tr>
<tr>
<td>EN13481-5 track category</td>
<td>Cat A</td>
<td>Cat B</td>
</tr>
<tr>
<td>Maximum axle load*</td>
<td>130 kN</td>
<td>180 kN</td>
</tr>
<tr>
<td>Minimum curve radius*</td>
<td>40 m</td>
<td>80 m</td>
</tr>
</tbody>
</table>

* For special applications consult PANDROL

### Typical performance data* as identified by Track Category in EN 13481-1

<table>
<thead>
<tr>
<th>Value</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly static stiffness</td>
<td>&gt;70 kN/mm</td>
</tr>
<tr>
<td>Assembly dynamic stiffness</td>
<td>&gt;80 kN/mm</td>
</tr>
<tr>
<td>Electrical insulation</td>
<td>&gt;10 kΩ</td>
</tr>
</tbody>
</table>

Nominal toe load
Clamping force >16 kN
Creep resistance >7 kN
Lateral adjustment +/-7.5 mm to +/- 10 mm
Vertical adjustment +/- 1 mm to 2/+3 mm

### COMPLIANCE WITH STANDARDS:
The NABLA EVOLUTION System complies with the European CEN Standard 13481-2.

**NOTE:**
PANDROL is an innovator and designer of bespoke rail fastenings. The data shown above is indicative of typical performance, but is naturally dependant on external factors. Should you have different requirements, please contact us to discuss tailoring products to suit local operating conditions. The technical information given in this brochure was correct at the time of printing, however the company undertakes a continuing programme of research and development and improvements may since have been introduced.

PANDROL TRACK SYSTEMS

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