ABB’s Effilight® traction transformer enables new opportunities in rail vehicle design. Based on an innovative approach to mechanical integration, this major advancement of a proven technology offers unprecedented energy efficiency and lightweight transformers.

Key features
- Innovative approach to mechanical integration by keeping oil exactly where needed around the windings
- Flexibility in design saves weight and improves energy efficiency in comparison to standard solution
- Unique and patented design
- Suitable for roof, machine room and underframe installation
- Available for 15 kV and 25 kV
- Available in steel or aluminum tank
- Appropriate for retrofit and new train platform
- Air natural cooling enabler (ODAN)
- Modular concept

Customer benefits and savings
- Proven lifetime using oil for insulation
- Maximum weight or energy savings, or any intermediate solution tailored to customer needs
- Reuse of the same active part for different mounting positions
- Life cycle costs reduction
- Less maintenance
- Reduction of cooling unit size and power
- Reduction of auxiliary consumption
- Lower environmental impact as well as acoustic noise level
- Reduced infrastructure wear-off
- Improved train design flexibility
- Best-in-class technology for traction systems

ABB as your competitive edge
- More than 100 years of expertise in traction transformers
- Worldwide leader in traction traction transformers
- Estimated installed base of 40’000 units worldwide
- Global supplier with global footprint
- Proven track record with many references worldwide
- Dedicated team of rail professionals
- Unrivalled level of engineering support and after-sales service

Average weight savings (Up to)
<table>
<thead>
<tr>
<th>Power</th>
<th>15 kV/16.7 Hz</th>
<th>25 kV/50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 MVA</td>
<td>- 20 %</td>
<td></td>
</tr>
<tr>
<td>2.0 MVA</td>
<td>- 10 to - 15 %</td>
<td>- 20 %</td>
</tr>
<tr>
<td>3.0 MVA</td>
<td>- 10 %</td>
<td>- 15 %</td>
</tr>
<tr>
<td>4.0 MVA</td>
<td></td>
<td>- 10 %</td>
</tr>
</tbody>
</table>

Average loss reduction (Up to)
<table>
<thead>
<tr>
<th>Power</th>
<th>15 kV/16.7 Hz</th>
<th>25 kV/50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 MVA</td>
<td>+ 50 %</td>
<td></td>
</tr>
<tr>
<td>2.0 MVA</td>
<td>+ 20 to + 30 %</td>
<td>+ 50 %</td>
</tr>
<tr>
<td>3.0 MVA</td>
<td>+ 20 %</td>
<td>+ 20 to + 40 %</td>
</tr>
<tr>
<td>4.0 MVA</td>
<td>+ 20 %</td>
<td></td>
</tr>
</tbody>
</table>
Roof mounted 1.1MVA 15kV 16.7Hz / 25kV 50Hz traction transformer

- --- Classical 15kV
- --- Classical 25kV
- Effilight 15kV
- Effilight 25kV

Comparison of transformer efficiency as function of the output power. In the case of bi-system traction transformers too, Effilight offers a significant improvement in terms of efficiency compared to the classical technology.

Roof mounted 1.1MVA 15kV 16.7Hz traction transformer - Typical efficiency vs. weight curve

- Efficiency to weight curve relationship for classic transformer
- Efficiency to weight curve relationship for Effilight

Increasing efficiency always requires increasing weight. Since Effilight offers a significant reduction of weight at equal efficiency, it is possible to get drastically improved efficiency compared to the classical technology at the same weight.

1) Benefit of Effilight in weight reduction
2) Reinvested benefit of Effilight in losses reduction