SIDERVAL
SPECIAL PROFILES IN STEEL

Railway

Hot Extruded Special Steel Profiles for Tram Rail Curves

Profile: Special Profile
Material grade: Carbon steel C45, normalized
Execution: Hot Extruded
Destination: Worldwide

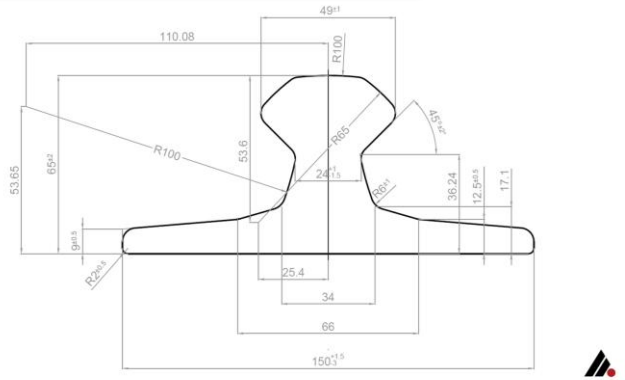
BACKGROUND

In urban tramway networks, rail wear is not evenly distributed along the track.

It concentrates in curved sections, where the contact geometry between wheel and rail changes and the load on the guiding flange increases. In these sections the service life of the track is considerably shorter, and every replacement requires an interruption of service. A tramway infrastructure manufacturer approached Siderval to develop a profile dedicated to these positions.

The goal was a section with documented mechanical properties and stable geometry, to be installed only where the operating conditions justify it.

CHALLENGE



The project presented three main technical and production challenges:

- The profile required an asymmetrical section with a guiding groove and wide radii, a geometry not covered by the rolled rail sections available on the market.
- The geometry had to remain consistent over the full length, with straightness and twist within 1 mm/m, to ensure continuity of the running surface where the profile joins the existing track.
- The solution had to remain cost-effective on limited quantities, without the minimum volumes required by a dedicated rolling campaign.

SOLUTION

Together with the customer, Siderval engineered a hot-extruded special steel profile in C45 carbon steel to EN ISO 683-1, supplied in the normalized condition.

Hot extrusion makes it possible to obtain the required section directly, including the thicker areas at the running surface, with a finished section of 28.1 kg per metre corresponding to approximately 3,580 mm^2. In the relevant thickness range this grade provides a minimum yield strength of 305 MPa, a minimum tensile strength of 580 MPa and a minimum elongation of 16 per cent.

The near-net shape reduces subsequent machining and makes small production batches viable, dedicated to curved sections in continuity with the rolled rails used on straight runs.