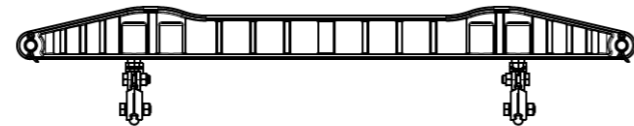
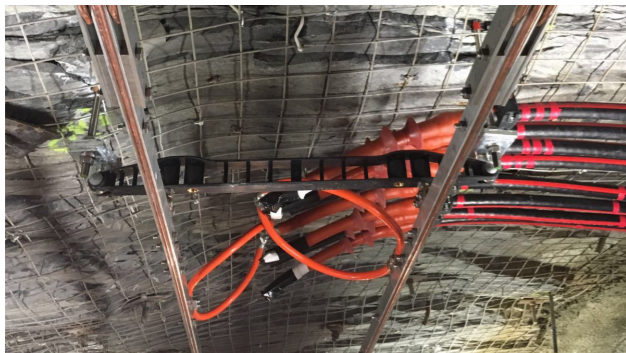


Contact wire reinforcement profile in the Jungfrau tunnel

Switzerland

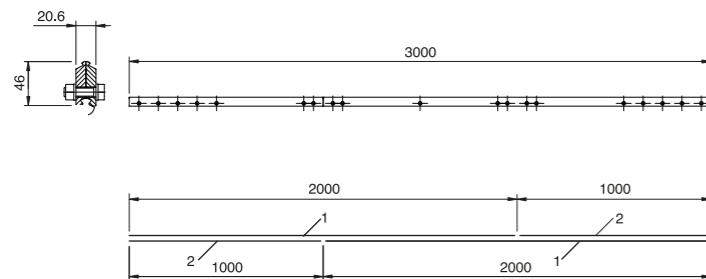
The Jungfrau railway is purchasing new multiple units and fitting its existing twin units with a new traction system. An inspection of the traction current supply at 1,125 V revealed that the contact wire reinforcement profile was the best way to reinforce the cross-section of the overhead contact line, primarily because of its low installation height. Two parallel contact wire reinforcement profiles are installed in tunnel areas every five metres with an insulated supporting structure.



Catalogue article

Contact wire reinforcement, basis

4643



Note:

Tightening torque: Bolt M 10 MA = 25 Nm

Drawing number:

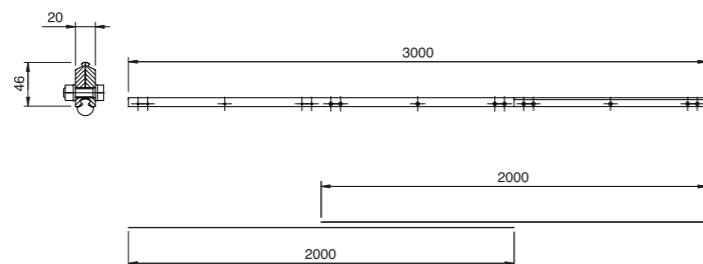
963.01853

Ordering information:

4643 Contact wire reinforcement, basis

Contact wire reinforcement, enlargement

4644



Note:

Tightening torque: Bolt M 10 MA = 25 Nm

Drawing number:

963.01854

Ordering information:

4644 Contact wire reinforcement, enlargement



Contact wire reinforcement profile

System Furrer+Frey®

Description

The contact wire reinforcement profile was developed and patented in 2013 in partnership with SNCF. Using the contact wire reinforcement profile significantly reduces contact wire heating when vehicles are at a standstill. The aluminium profiles clamped to the contact wire improve local heat dissipation at the contact point between the contact wire and the pantograph contact strip. The problem for SNCF was that the contact wire in the simple overhead line would fail when pre-heating or cooling the vehicles on the sidings, particularly in winter. The increased temperature in the contact wire changed its mechanical properties and the tension in the contact wire caused it to part.

The following improvements can be achieved using the contact wire reinforcement:

- Better heat removal via the aluminium profiles
- Securing the contact wire at both ends of the rail can prevent the contact wire from parting at the contact wire reinforcement
- The electrical cross-section is increased

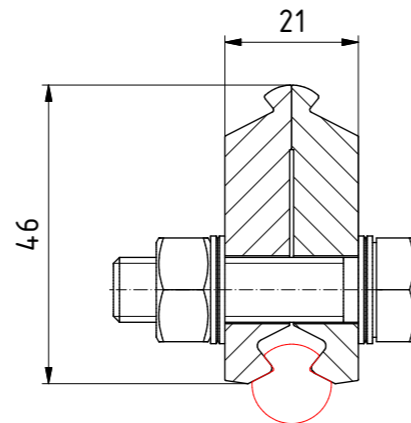
Areas of application

The contact wire reinforcement offers a simple, robust solution to heating issues with contact wires and reinforces the wire.

- It can be used in depots, depot access routes and sidings; anywhere trains are regularly stabled
- It can also be used underground or in tunnels where space is very limited
- Contact wire reinforcement can also be used on twin contact areas to prevent the problem of electrical heating when the vehicle is at a standstill
- Can be used at stations (to mitigate contact wire parting), as additional protection in public areas

Technical details

Material:	Aluminium alloy
Aluminium cross-section (without contact wire)	775 [mm ²]
Copper equivalent cross-section (without contact wire)	490 [mm ²]
Weight without contact wire	2.1 [kg/m]
Permissible tensile force	16 [kN]
Permissible contact wire cross-sections ...	80 [mm ²] to 150 [mm ²]
Span between supports without catenary	5 [m]
Span between supports with catenary.....	approx. 60 [m]
Permissible speed	120 [km/h] Higher speeds are possible but simulations or field tests are required



Case studies

RER C siding in Dourdan

France

The first contact wire reinforcement profile was installed on the RER C line in the French town of Dourdan in 2014. In winter, multiple units are pre-heated via the overhead contact line on a siding measuring about 200 m long. The high current requirement and associated heating of the contact wire caused the wire to part in multiple places along the overhead line. The voltage on the RER C line is 1,500 V. The four sections fitted with the contact wire reinforcement profiles were between 13 and 23 m long. F+F FL 200 cantilevers were installed on the SNCF rail network for the first time as part of the work, to support the slight increase in mass.



Access routes to Västerås depot

Sweden

Trains are often pre-heated on the access routes to the Västerås depot before operation, with the electricity being drawn directly from the overhead contact line and loading the contact wire at specific points. To protect the wire from heat damage or splitting, the F+F contact wire reinforcement was installed.



Delhi Metro line 5

India

Localised high contact wire temperatures were discovered in contact wires, in particular directly next to the supply points. Using the contact wire reinforcement helped prevent the wire from parting. The line speed is 80 km/h.

