

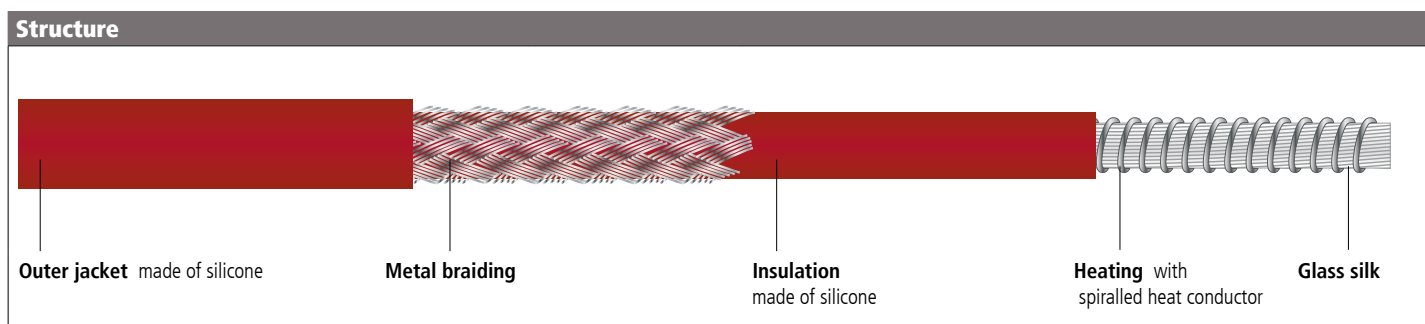
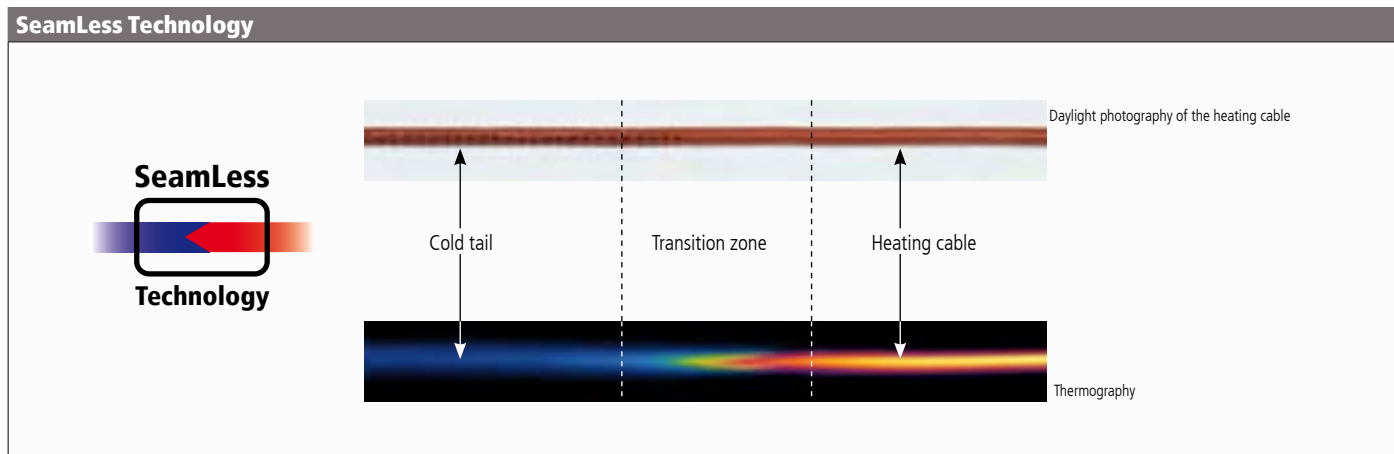
2. HEATING CABLE IN SEAMLESS TECHNOLOGY SERIES WKS

Winkler is constantly on the search for better materials, new manufacturing processes and innovative design concepts in order to make its products more durable and reliable. This is particularly important in rail technology, where high reliability over a long period and under the harshest conditions really matters.

Electrical heating devices in rail technology are usually subjected to environmental influences, such as temperature fluctuations, moisture and sometimes even chemicals. The also experience high levels of electrical and mechanical stress, especially due to vibrations, under extreme conditions also due to projectiles.

If, despite all precautions, failures occur in such applications, the causes may also be found at the transition between the heat conductor and connecting cable (cold conductor). Irrespective of whether this transition is realised with a separate clamp, a crimp connection, a plug or a soldered or welded joint, it is always an electrical connection and therefore a potential vulnerability.

For this reason, Winkler deploys SeamLess Technology in demanding applications. This design principle forgoes an additional electrical connection, the cold connecting cable is already integrated in the heating cable. The connection between the heat conductor and connecting cable is uninterrupted, invisible from the outside, i.e. "seamless".

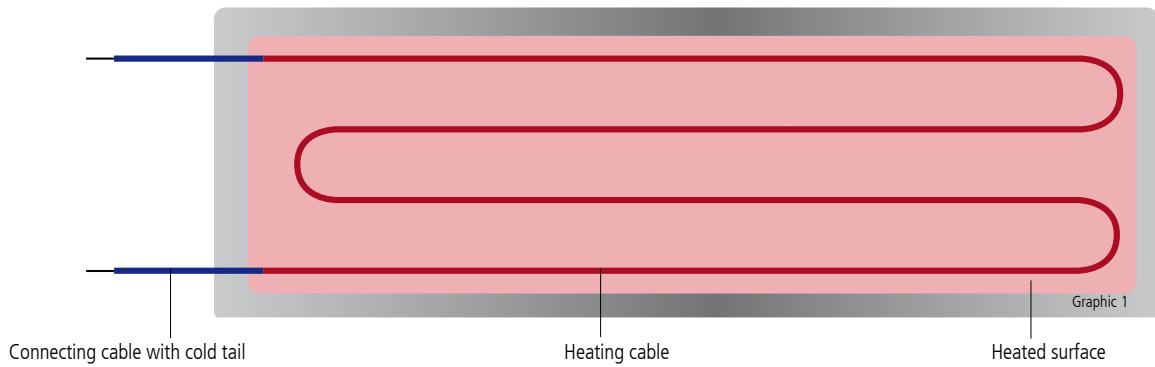


Features and benefits of SeamLess Technology	
Consistently homogeneous material structure	→ ideal performance with temperature fluctuations
Robust structure made of high quality materials	→ long service life, high reliability
No gap and no seal in the outer jacket	→ high resistance to moisture and other environmental influences
No change in cross-section (thickening) at transition	→ low risk due to friction and chafing
Spiralled heat conductor	→ no length variation with temperature changes
No additional electrical connections / heat conductors / cold ends	→ ideal behaviour with mechanical loads (especially vibrations)
Customer-specific lengths and properties of heating conductors and cold ends	→ Different power distribution over the length possible (see Graphic 1, p. 5) Selective heating of only certain zones possible (see Graphic 2, p.5)
Wide selection of heat conductor values	→ individual heat conductors, operating voltages and lengths can be achieved

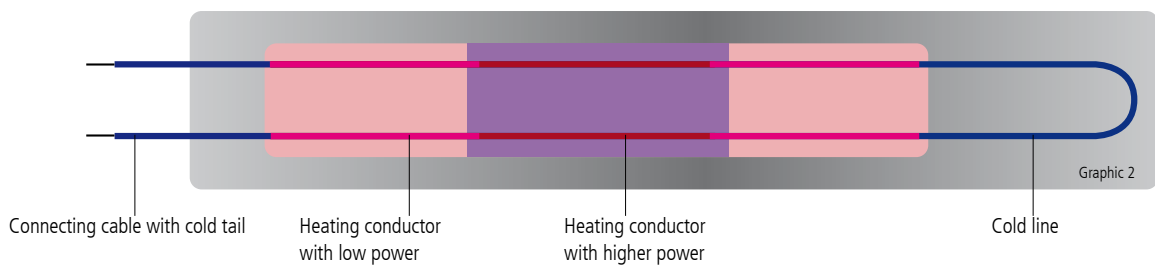
Technical data WKTRAIL1 heating cables	
Perm. operating temperature	max. 150 °C
Perm. ambient temperature	-50° to +80 °C
Operating voltage	max. 800 V AC/DC
Test voltage	2,000 V AC
Power	max. 40 W/m (selectable in sections)
Protection class	IP68
Length	min. 1 m to max. 50 m
Outer diameter	5 mm
Bending radius	min. 25 mm
Weight	50 g/m

Design examples

STANDARD | Heating cable with one heated section and one heating power



SPECIAL DESIGN | Heating cable with two heated sections and two heating powers



Applications

<p>1. For heating large surfaces in floors and wall panels with meandering routing.</p>	<p>2. For heating (hollow) profiles by drawing in or longitudinal routing</p>	<p>3. For heating pipes and hoses with spiralled routing ($\phi > 50 \text{ mm}$) with double-sided and single-sided connection</p>

Application example

