



CABLE BONDING AND FIXATION SYSTEMS

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Legend of Abbreviations

- AS Connecting cables
- BÜ Level crossing
- DB Deutsche Bahn AG
(German Railway AG)
- EV End connector
- EBA Eisenbahn-Bundesamt
(German Federal Railway Office)
- GAk Lineside box
- KA Cable branch
- KSS Cable protection conduit
- KSV Short-cut connectors
- LL Line cables
- NV Public transport
- PAV Potential compensating connector
- SDK Double-sided rail plug
- SFK Rail foot clamp
- SK Sleeper clamp
- SV Rail connector

voestalpine SIGNALING Sainerholz



Headquarters in Sainerholz, Germany

Founded on 14.08.1986 voestalpine SIGNALING Sainerholz GmbH has its headquarters in Sainerholz, Germany. The company acts as a centre of excellence for rail bonding and fixation systems, point machine -, point lock -, and signalling technology. All products are developed, produced and marketed at the Sainerholz site.

As part of one of the largest steel producers, the company not only has a long track record in the fields of turnout, rail and signalling technologies, but also counts on a large number of sister companies and support centres, which guarantee for high-quality service and support worldwide.

As a technology leader, we also offer innovative and technically sophisticated system solutions for signalling technology – in close cooperation with our sister companies.

As a long-standing system supplier in the segment of Rail bonding and fixation systems, the company offers the complete portfolio for cabling in and around the track area and has already been able to gain customers worldwide in the course of its history, as e.g. Deutsche Bahn AG (German Railway) ÖBB (Austrian Railways) and SBB (Swiss Railways).

RAIL FOOT CLAMPS



Rail foot clamp 2 mm with one cable

SYSTEM ADVANTAGES

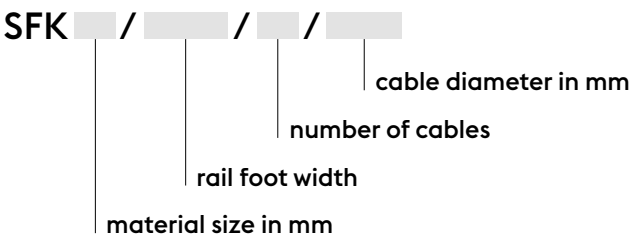
- » fast and easy cable laying
- » cleanly routed cable at the rail web
- » weatherproof stainless steel clamp
- » protected against vandalism
- » rounded edges guarantee for secure protection
- » standard clamp tool-free mounted

For fast and secure cable laying along the rail, rail foot clamps are a reasonable alternative to the time-consuming and costly construction of a conventional cable trough. Rail foot clamps instead offer a reliable, secure and cost-effective replacement. Furthermore, provision for temporary cable installation can be realized quickly and easily.

System features

- » for fixation of cables of all types, e.g. earthing and signalling cables, as well as rail foot mounted continuous train control (LWL cable)
- » fixation of up to four cables per clip
- » grade of material: stainless spring steel strip 30 x 2 mm, or our standard 30 x 1 mm
- » approvals of DB AG (German railways), ÖBB (Austrian railways), SBB (Swiss railways) and others, as well as various public transport companies
- » various assembly and disassembly tools available for easy and ergonomical handling
- » EBA approved
- » patented design
- » available for all kinds of rail sections

Designation of our rail foot clamps is based on the following scheme:



Rail foot clamp 2 mm with two cables



Rail foot clamp standard 1 mm

The Suitable Rail Foot Clamp

Type of rail

Each rail section requires a respectively suited rail foot clamp. The ideal rail foot clamp fits perfectly to the rail foot and guarantees for a proper guidance and fixation of the cable at the rail, excluding any unwanted movement of it.

Consequently, we provide particularly designed rail foot clamps for any type of rail and size of cable as well.

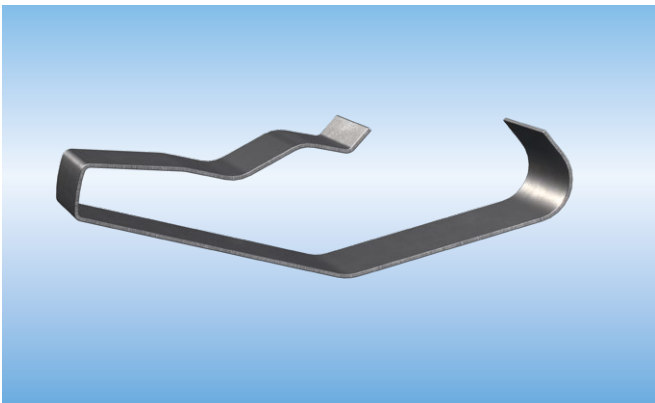
Material strength

There are two material strengths available with our rail foot clamps: 1 mm and 2 mm. Our standard 1mm variant covers most application requirements. Its mounting to the rail is easily performed manually and tool-free.

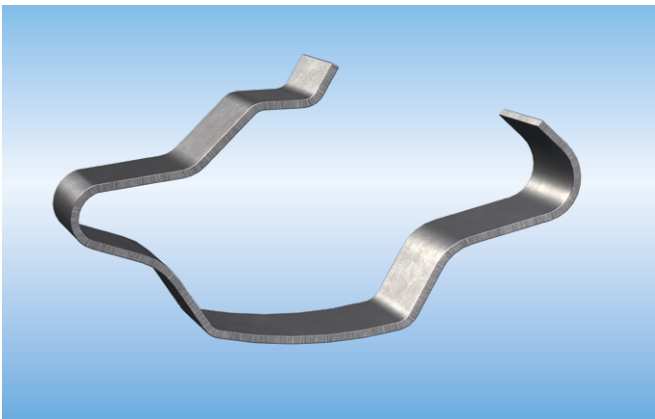
The 2 mm variant is designed with regard to heavy cable types. Mounting is performed by using an ergonomically designed tool for ease of installation. Due to the more health-friendly use many of our long-standing customers use this tool also for the 1 mm variant. Dismounting of the 2 mm version must always be performed using the tool and provides further protection against vandalism.

Number of cables

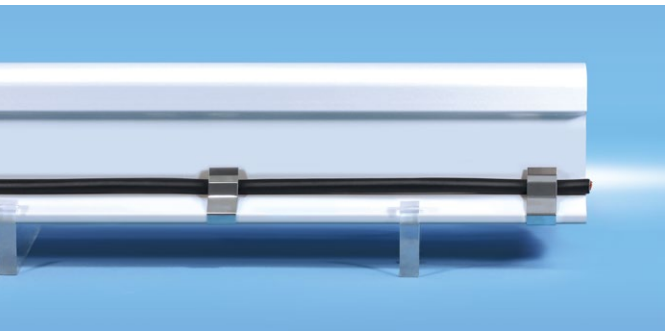
Depending on the cable diameter up to four cables can be fixed at the rail web.



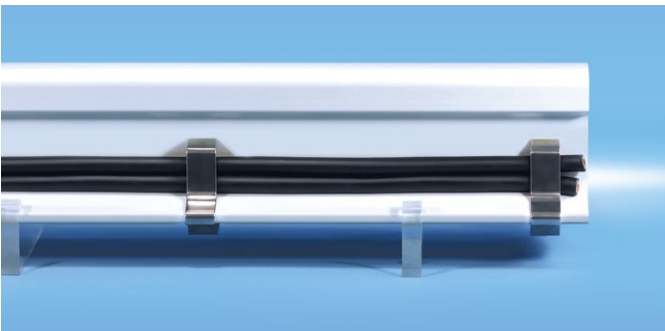
Rail foot clamp 1 mm



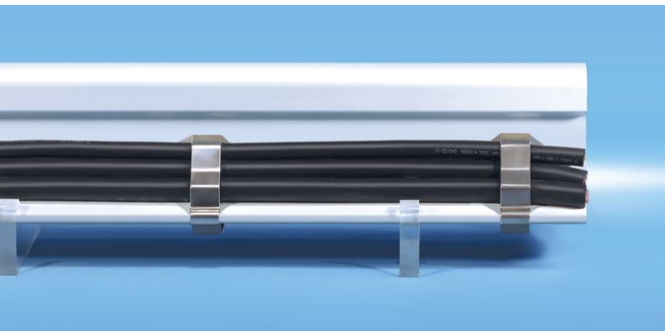
Rail foot clamp 2 mm



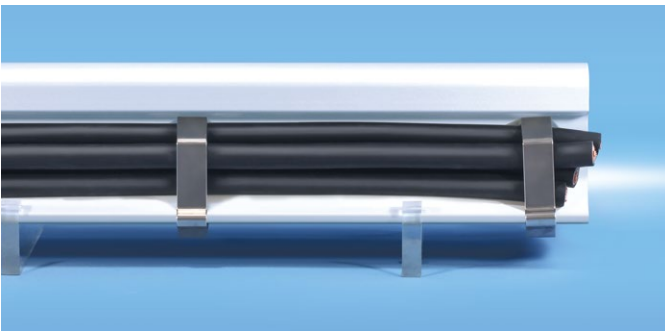
Rail foot clamp with one cable



Rail foot clamp with two cables



Rail foot clamp with three cables



Rail foot clamp with four cables

RAIL FOOT CLAMPS

Rail Foot Clamps in 1 mm Material Strength

49E1 / 54E3 (S 49/S 54)

Number of cables	Material strength	Cable diameter in mm	Type
1	1 mm	10-14	SFK 1/125/1/10-14 (LL)
1	1 mm	15-22	SFK 1/125/1/15-22
1	1 mm	22-30	SFK 1/125/1/22-30
For heating element	1 mm	-	SFK 1/125/WHZSTAB

54E1 (UIC 54/SBB III)

Number of cables	Material strength	Cable diameter in mm	Type
1	1 mm	10-14	SFK 1/140/1/10-14 (LL)
1	1 mm	15-22	SFK 1/140/1/15-22
1	1 mm	22-30	SFK 1/140/1/22-30
For heating element	1 mm	-	SFK 1/140/WHZSTAB

60E1 (UIC 60/SBB VI)

Number of cables	Material strength	Cable diameter in mm	Type
1	1 mm	10-14	SFK 1/150/1/10-14 (LL)
1	1 mm	15-22	SFK 1/150/1/15-22
1	1 mm	22-30	SFK 1/150/1/22-30
For heating element	1 mm	-	SFK 1/150/WHZSTAB

AREA 115RE (AREMA Standard)

Number of cables	Material strength	Cable diameter in mm	Type
1	1 mm	10-14	SFK 1/139,7/1/10-14 (LL)
1	1 mm	15-22	SFK 1/139,7/1/15-22
1	1 mm	22-30	SFK 1/139,7/1/22-30
For heating element	1 mm	-	SFK 1/139,7/WHZSTAB

56E1 (BS 113A British Steel)

Number of cables	Material strength	Cable diameter in mm	Type
1	1 mm	10-14	SFK 1/140/1/10-14 (LL)
1	1 mm	15-22	SFK 1/140/1/15-22
1	1 mm	22-30	SFK 1/140/1/22-30
For heating element	1 mm	-	SFK 1/140/WHZSTAB

Rail foot clamps can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

We would be pleased to advise you which rail foot clamp is most suitable for your application.

Further product variants see page 8

Rail Foot Clamps in 2 mm Material Strength

49E1 / 54E3 (S 49/S 54)

Number of cables	Material strength	Cable diameter in mm	Type
1	2 mm	10-14	SFK 2/125/1/10-14
1	2 mm	15-22	SFK 2/125/1/15-22
1	2 mm	22-32	SFK 2/125/1/22-32
1	2 mm	3x4x1,4 mm ² (DuoTrack)	SFK 2/125/1/3x4x1,4 mm ²
1	2 mm	8x4x1,4 mm ² (DuoTrack)	SFK 2/125/1/8x4x1,4 mm ²
2	2 mm	15-22	SFK 2/125/2/15-22
2	2 mm	22-32	SFK 2/125/2/22-32
3	2 mm	120 mm ²	SFK 2/125/3/120 mm ²
3	2 mm	150 mm ²	SFK 2/125/3/150 mm ²
4	2 mm	120 mm ²	SFK 2/125/4/120 mm ²
Cover plate for rail connections	2 mm	For return conductors and functional earthing conductors	SFK 2/125/SCHUTZAB

54E1 (UIC 54/SBB III)

Number of cables	Material strength	Cable diameter in mm	Type
1	2 mm	10-14	SFK 2/140/1/10-14
1	2 mm	15-22	SFK 2/140/1/15-22
1	2 mm	22-32	SFK 2/140/1/22-32
2	2 mm	15-22	SFK 2/140/2/15-22
2	2 mm	22-32	SFK 2/140/2/22-32
4	2 mm	15-22	SFK 2/140/4/15-22
4	2 mm	22-32	SFK 2/140/4/22-32
Cover plate for rail connections	2 mm	For return conductors and functional earthing conductors	SFK 2/140/SCHUTZAB

60E1 (UIC 60/SBB VI)

Number of cables	Material strength	Cable diameter in mm	Type
1	2 mm	10-14	SFK 2/150/1/10-14
1	2 mm	15-22	SFK 2/150/1/15-22
1	2 mm	22-32	SFK 2/150/1/22-32
1	2 mm	3x4x1,4 mm ² (DuoTrack)	SFK 2/150/1/3x4x1,4 mm ²
1	2 mm	8x4x1,4 mm ² (DuoTrack)	SFK 2/150/1/8x4x1,4 mm ²
2	2 mm	15-22	SFK 2/150/2/15-22
2	2 mm	22-32	SFK 2/150/2/22-32
3	2 mm	120 mm ²	SFK 2/150/3/120 mm ²
3	2 mm	150 mm ²	SFK 2/150/3/150 mm ²
4	2 mm	120 mm ²	SFK 2/150/4/120 mm ²
Cover plate for rail connections	2 mm	For return conductors and functional earthing conductors	SFK 2/150/SCHUTZAB

RAIL FOOT CLAMPS

Rail Foot Clamps in 2 mm Material Strength

AREA 115RE (AREMA Standard)

Number of cables	Material strength	Cable diameter in mm	Type
1	2 mm	10-14	SFK 2/139,7/1/10-14 (LL)
1	2 mm	15-22	SFK 2/139,7/1/15-22
1	2 mm	22-32	SFK 2/139,7/1/22-32
2	2 mm	15-22	SFK 2/139,7/2/15-22
2	2 mm	22-32	SFK 2/139,7/2/22-32
4	2 mm	15-22	SFK 2/139,7/4/15-22
4	2 mm	22-32	SFK 2/139,7/4/22-32

56E1 (BS 113A British Steel)

Number of cables	Material strength	Cable diameter in mm	Type
1	2 mm	10-14	SFK 2/140/1/10-14
1	2 mm	15-22	SFK 2/140/1/15-22
1	2 mm	22-32	SFK 2/125/1/22-32

Rail foot clamps for other rail types (incl. constructional rails) available upon request.



VIDEO
Mounting / Dismounting with
the respective tool / long version
https://youtu.be/_08lvk_lgL8

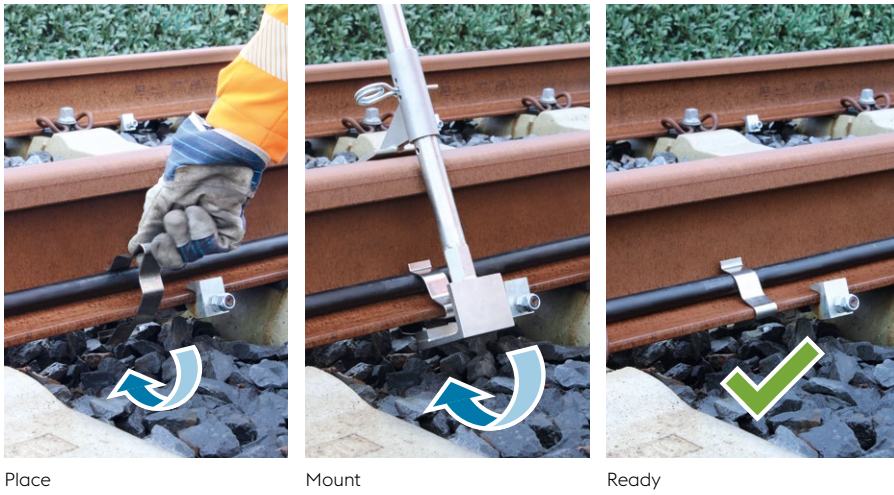
Rail foot clamps can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

MOUNTING / DISMOUNTING TOOL

Our respectively designed tools are optimally suited for mounting and dismounting of rail foot clamps. Compared to assembly by hand, the burden on the workers and the risk of ballast-related injuries are significantly reduced.

System features

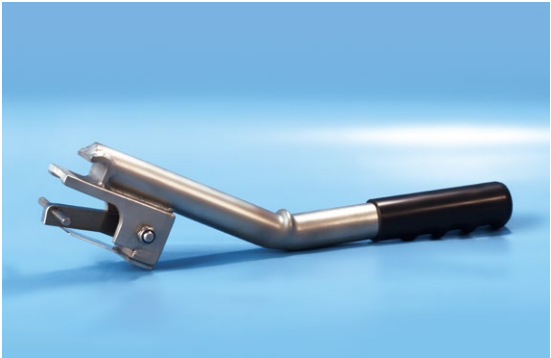
- » **Mounting / Dismounting tool – short version**
 - » EBA approved and DB released
 - » lightweight design
 - » very easy to handle
 - » fits in every toolbox
- » **Mounting / Dismounting tool – long version**
 - » EBA approved and DB released
 - » solid design
 - » with stem nose for unclipping the rail foot clamp
 - » suitable as slotting tool for ballast removal



SYSTEM ADVANTAGES

- » easy mounting in a few seconds
- » design enables ergonomic and faster operation
- » suitable for all our rail foot clamps

Mounting / Dismounting Tools: Short Version



Long Version



The mounting /dismounting tool can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

CLIPFIX



Route wiring with ClipFix

SYSTEM ADVANTAGES

- » protection against UV radiation
- » secure tamping and ballast operations
- » cables protected against falling objects (e.g. patches of ice)
- » allows for thermal length changes of the cable within the chamber
- » fast laying due to one-piece clamp
- » possible retrofit with further cables
- » continuous and highest cable protection



Route wiring with ClipFix

ClipFix is designed for the protection of rail web located cables, thus eliminating the need for cable troughs within the track area.

System features

- » suitable for all types of cables
- » made of either stainless or hot-dip galvanized steel
- » delivered as set
- » available on short notice
- » perfectly suited for level crossing cabling
- » EBA approved and DB released
- » patent protected design
- » accommodates cables of up to 29 mm in diameter

ClipFix is available in two variants:

- » **3 m:** consisting of 1 Z-section (3 m) und 3 rail foot clamps of 2 mm material strength
- » **6 m:** consisting of 1 Z-section (6 m) und 5 rail foot clamps of 2 mm material strength

49E1 / S49

Length	Rail foot	Type
3 m (galvanized steel)	125 mm	ClipFix/125/3M
6 m (galvanized steel)	125 mm	ClipFix/125/6M
3 m (stainless steel)	125 mm	ClipFix/125/3M/VA
6 m (stainless steel)	125 mm	ClipFix/125/6M/VA

60E1 / UIC60

Length	Rail foot	Type
3 m (galvanized steel)	150 mm	ClipFix/150/3M
6 m (galvanized steel)	150 mm	ClipFix/150/6M
3 m (stainless steel)	150 mm	ClipFix/150/3M/VA
6 m (stainless steel)	150 mm	ClipFix/150/6M/VA

Further designs upon request.



VIDEO
Mounting / Automated Tamping
<https://youtu.be/4lXulJCq12s>

ClipFix can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

SLEEPER CLAMPS

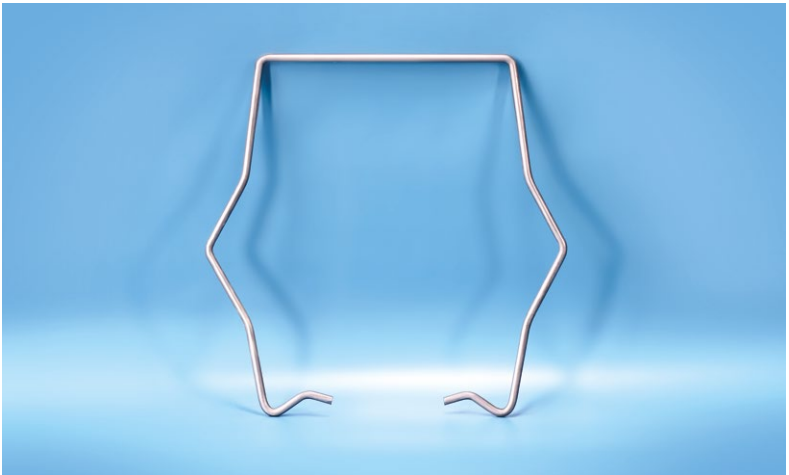
Sleeper clamps are used for secure and protected guidance of cables along the sleeper. Furthermore, they are also utilised for fixation of cable branches.

System features

- » for concrete sleepers B 58 / B 70 / B 90
- » for other sleeper types upon request
- » suitable for cable and wire guiding (FTGS) in longitudinal and transverse track direction
- » ballast brush protected, as the cable is kept 40 mm below top of rail

Type of sleeper	Position	Type
B 58	Sleeper › center	SK/B58/Typ 1
B 58	Sleeper › close to rail	SK/B58/Typ 2
B 58	Sleeper › head end	SK/B58/Typ 3
B 70	Sleeper › center	SK/B70/Typ 1
B 70	Sleeper › close to rail	SK/B70/Typ 2
B 70	Sleeper › head end	SK/B70/Typ 3
B 90	Sleeper › center	SK/B90/Typ 1
B 90	Sleeper › close to rail	SK/B90/Typ 2
B 90	Sleeper › head end	SK/B90/Typ 3

Further designs available upon request.



Example sleeper clamp



Fixation of the cable branch by means of sleeper clamps

SYSTEM ADVANTAGES

- » increased tension due to bow-shaped sides
- » no damage to the sleeper during installation – thus water ingress and subsequent possible frost damage is excluded



Fixation of the cable branch by means of sleeper clamps

Sleeper clamps can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

CABLE BRANCH



Application standard cable branch

SYSTEM ADVANTAGES

- » easy mounting
- » corrosion resistant stainless steel
- » weatherproof
- » secure protection of the cable in case of tamping and ballasting procedures
- » all-round protection of the cable



Cable branch standard



Cable branch cranked

Cable branches are utilised for exit and entry of a cable, as well as for bypassing obstacles in the track area. Cable branches protect the cable in particular and provide a secure guiding alongside the sleeper.

System features

- » cable branches are available as open-, half-pipe-, and closed variant
- » for mounting either at or on the sleeper
- » full set including rail foot clamps and fastening material
- » available for all rail types
- » standard available ex stock on short notice
- » EBA approved and DB released

The set consists of 1 cable branch, 3 rail foot clamps plus fastening material for fixation of the cable branch to the sleeper.

Version	Execution	Cable diameter
Cranked	Closed	1 cable up to 22 mm
Cranked	Open	1 cable up to 28 mm
Standard	Open	1 cable up to 29 mm



Securely guided cable for any tamping operation

Standard Execution



Cranked Execution



Type of rail	Type of sleeper	Version	Direction	Type
49E1 / 54E3 (S49 / S54)	B 58	Cranked	Right side closed	KA/125/B58/Typ2/RG
		Cranked	Right side open	KA/125/B58/Typ2/RO
		Cranked	Left side closed	KA/125/B58/Typ2/LG
		Cranked	Left side open	KA/125/B58/Typ2/LO
		Standard	Double-sided	KA/125/B58/Typ5
49E1 / 54E3 (S49 / S54)	B 70	Cranked	Right side closed	KA/125/B70/Typ2/RG
		Cranked	Right side open	KA/125/B70/Typ2/RO
		Cranked	Left side closed	KA/125/B70/Typ2/LG
		Cranked	Left side open	KA/125/B70/Typ2/LO
		Standard	Double-sided	KA/125/B70/Typ5
49E1 / 54E3 (S49 / S54)	B 90	Cranked	Right side closed	KA/125/B90/Typ2/RG
		Cranked	Right side open	KA/125/B90/Typ2/RO
		Cranked	Left side closed	KA/125/B90/Typ2/LG
		Cranked	Left side open	KA/125/B90/Typ2/LO
		Standard	Double-sided	KA/125/B90/Typ5
49E1 / 54E3 (S49 / S54)	Wooden sleeper	Cranked	Right side closed	KA/125/Holz/Typ2/RG
		Cranked	Right side open	KA/125/Holz/Typ2/RO
		Cranked	Left side closed	KA/125/Holz/Typ2/LG
		Cranked	Left side open	KA/125/Holz/Typ2/LO
		Standard	Double-sided	KA/125/Holz/Typ5
54E1 (UIC 54)	B 58	Cranked	Right side closed	KA/140/B58/Typ2/RG
		Cranked	Right side open	KA/140/B58/Typ2/RO
		Cranked	Left side closed	KA/140/B58/Typ2/LG
		Cranked	Left side open	KA/140/B58/Typ2/LO
		Standard	Double-sided	KA/140/B58/Typ5
54E1 (UIC 54)	B 70	Cranked	Right side closed	KA/140/B70/Typ2/RG
		Cranked	Right side open	KA/140/B70/Typ2/RO
		Cranked	Left side closed	KA/140/B70/Typ2/LG
		Cranked	Left side open	KA/140/B70/Typ2/LO
		Standard	Double-sided	KA/140/B70/Typ5

Further product executions on page 14

CABLE BRANCH

Type of rail	Type of sleeper	Version	Direction	Type
54E1 (UIC 54)	B 90	Cranked	Right side closed	KA/140/B90/Typ2/RG
		Cranked	Right side open	KA/140/B90/Typ2/RO
		Cranked	Left side closed	KA/140/B90/Typ2/LG
		Cranked	Left side open	KA/140/B90/Typ2/LO
		Standard	Double-sided	KA/140/B90/Typ5
54E1 (UIC 54)	Wooden sleeper	Cranked	Right side closed	KA/140/Holz/Typ2/RG
		Cranked	Right side open	KA/140/Holz/Typ2/RO
		Cranked	Left side closed	KA/140/Holz/Typ2/LG
		Cranked	Left side open	KA/140/Holz/Typ2/LO
		Standard	Double-sided	KA/140/Holz/Typ5
60E1 (UIC 60)	B 58	Cranked	Right side closed	KA/150/B58/Typ2/RG
		Cranked	Right side open	KA/150/B58/Typ2/RO
		Cranked	Left side closed	KA/150/B58/Typ2/LG
		Cranked	Left side open	KA/150/B58/Typ2/LO
		Standard	Double-sided	KA/150/B58/Typ5
60E1 (UIC 60)	B 70	Cranked	Right side closed	KA/150/B70/Typ2/RG
		Cranked	Right side open	KA/150/B70/Typ2/RO
		Cranked	Left side closed	KA/150/B70/Typ2/LG
		Cranked	Left side open	KA/150/B70/Typ2/LO
		Standard	Double-sided	KA/150/B70/Typ5
60E1 (UIC 60)	B 90	Cranked	Right side closed	KA/150/B90/Typ2/RG
		Cranked	Right side open	KA/150/B90/Typ2/RO
		Cranked	Left side closed	KA/150/B90/Typ2/LG
		Cranked	Left side open	KA/150/B90/Typ2/LO
		Standard	Double-sided	KA/150/B90/Typ5
60E1 (UIC 60)	Wooden sleeper	Cranked	Right side closed	KA/150/Holz/Typ2/RG
		Cranked	Right side open	KA/150/Holz/Typ2/RO
		Cranked	Left side closed	KA/150/Holz/Typ2/LG
		Cranked	Left side open	KA/150/Holz/Typ2/LO
		Standard	Double-sided	KA/150/Holz/Typ5
Further executions available upon request.				

Cable branches can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

CABLE DISTRIBUTORS

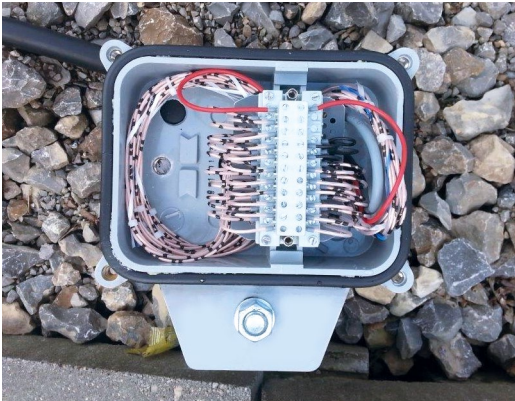
Cable distributors enable the secure connection of branch lines to main line.

System features

- » weather-resistant plastic cabinet for distribution of signalling cables
- » protection class: IP 65 (DIN 40050)
- » dimensions 228 x 120 x 232 mm (WxHxD)
- » can be wired with wire diameters up to 1,8 mm
- » weight 1,8 kgs



Cable distributor top view



Cable distributor open

Cable distributors can be ordered directly contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100



Cable distributor side view

EXCESS CABLE AND SLEEVE COUPLING STORAGE CABINETS



Overlength cabinet open

These cabinets are designed to store reserve lengths of cable. In case of construction operations the cable can be temporarily placed outside of the construction site area.

System features

- » door with pivoted handle for PHZ
- » protection class IP 44 acc. to IEC 60529 – cable storage for bending radius 330 mm
- » cable storage for up to 40-50 m
- » anti-lift-out protection for prevention of forcible door opening
- » in accordance with standards as per IEC 62208 for: IP, IK, Heat- and Fire Resistance, Insulation
- » 5000 V, weather and corrosion resistant
- » full insulation for units of class II in accordance with IEC 64139-1 standard



DuoTrack excess cable – Coupling Sleeve Assembly Kit

SYSTEM ADVANTAGES

- » reserve cable lengths in case of cable damage
- » robust design
- » variable expansion options
- » securely locate reserve cable outside the danger zone
- » vandalism protected

Reserve cable and sleeve coupling storage cabinets can be ordered directly by contacting Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

CABLE PROTECTION CONDUIT

In order to ensure weather resistance and protection against UV radiation of cables and to minimize wear occurrence or damage due to ballasting and tamping operations, the use of cable protection conduit is mandatory.



Cable protection conduit black



Cable protection conduit signal yellow (RAL 1003)

SYSTEM ADVANTAGES

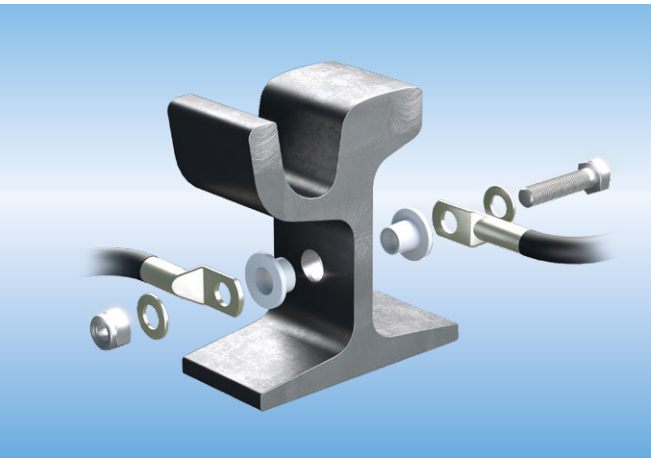
- » high resistance against UV radiation
- » temperature range between -40 °C and +135 °C
- » high protection against damage
- » reduced ageing effects of the cable
- » slotted execution

Inner diameter	Outer diameter	Packing unit	Color	Type
36,7 mm	42 mm	50 m	Black	KSS/37/Schwarz
47,8 mm	53,6 mm	50 m	Black	KSS/50/Schwarz
36,7 mm	42 mm	50 m	Signal yellow (DB RAL 1003)	KSS/37/Signalgelb
47,8 mm	53,6 mm	50 m	Signal yellow (DB RAL 1003)	KSS/50/Signalgelb

Further executions upon request.

Cable protection conduit can be ordered directly to specified type contacting Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

DOUBLE SIDED RAIL PLUG – SDK 02



Structure SDK 02

Our own custom designed and developed SDK 02’s fields of application are the areas of track circuits and earthing systems.

System features

- » fastening torque in case of Al cable lugs 50 Nm
- » fastening torque in case of Cu cable lugs 80 Nm
- » provides a gas-tight connection to the rail
- » EBA approved and DB released



VIDEO
Mounting
<https://youtu.be/vU71PrsiWi0>

SYSTEM ADVANTAGES

- » tool-free mounting
- » standard cylindrical drilling
- » mounting and fastening in one step

Our double sided rail plug SDK 02 is installed in just three steps:



Drill



Deburr



Tighten



Drilling hole diameter	Type of rail	Bolting	Rail web thickness	Type
19 mm	z.B.: 49E1 (S 49) 54E1 (S 54) 54E3 (UIC 54) 60E1 (UIC 60) 46E1 (SBB I) 60E2 AS60 39E1 (BS 80A) 45E1 (BS 90A)	M12x55	14-18 mm	SDK02/19/M12x55
19 mm	z.B.: 49E1 (S 49) 54E1 (S 54) 54E3 (UIC 54) 60E1 (UIC 60) 46E1 (SBB I) 60E2 AS60 39E1 (BS 80A) 45E1 (BS 90A)	M12x65	14-18 mm	SDK02/19/M12x65
19 mm	z.B.: 59R1 (RI59) 60R1 (RI60)	M12x55	12-14 mm	SDK02/19/M12x55/NV
22 mm	z.B.: 49E1 (S 49) 54E1 (S 54) 54E3 (UIC 54) 60E1 (UIC 60) 46E1 (SBB I) 60E2 AS60 39E1 (BS 80A) 45E1 (BS 90A)	M12x55	14-18 mm	SDK02/22/M12x55

Further designs upon request.

SDK 02 can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

CONNECTORS



Connectors with double-sided rail plug system SDK 02

SYSTEM ADVANTAGES

- » pre-configured, ready-made lengths
- » proven quality
- » fast installation
- » connections in conformity with applicable standards and regulations



Connectors with double-sided rail plug system SDK 02

Our connectors are manufactured according to customer specification with regard to respective length, diameter and individual connection in proven quality. Connection to the rail is realised either by using our double-sided rail plug system SDK 02 or in welded execution with a cable sleeve of size M24.

All types are manufactured in accordance with the respective DB standards and applicable light rail regulations.

Our range of connectors is as follows:

- » traction return current connectors
- » S connectors, FTGS connectors
- » track connectors
- » equipotential bonding connectors
- » end connectors
- » coaxial connectors
- » short-cut connectors
- » wire connectors for track circuits, signal- and protective ground

S-Connectors

Length	1 x 50 mm ²	1 x 120 mm ²	1 x 240 mm ²	2 x 120 mm ²
6,30 m / 6,30 m	SV50/6,30-6,30	SV120/6,30-6,30	SV240/6,30-6,30	SV/2x120/6,30-6,30
12,30 m / 12,30 m	SV50/12,30-12,30	SV120/12,30-12,30	SV240/12,30-12,30	SV/2x120/12,30-12,30
12,30 m / 6,30 m	SV50/12,30-6,30	SV120/12,30-6,30	SV2 40/12,30-6,30	SV/2x120/12,30-6,30

Equipotential bonding connectors

Length	1 x 50 mm ²	1 x 120 mm ²	1 x 240 mm ²	2 x 120 mm ²
10,00 m	PAV/50/10,00	PAV/120/10,00	PAV/240/10,00	PAV/2x120/10,00
15,00 m	PAV/50/15,00	PAV/120/15,00	PAV/240/15,00	PAV/2x120/15,00
25,00 m	PAV/50/25,00	PAV/120/25,00	PAV/240/25,00	PAV/2x120/25,00

Terminal Connectors

Length	1 x 50 mm ²	1 x 120 mm ²	1 x 240 mm ²	2 x 120 mm ²
10,60 m	EV/50/10,60	EV/120/10,60	EV/240/10,60	EV/2x120/10,60
19,40 m	EV/50/19,40	EV/120/19,40	EV/240/19,40	EV/2x120/19,40

Short-Cut Connectors

Length	1 x 50 mm ²	1 x 70 mm ²	1 x 95 mm ²	1 x 120 mm ²	2 x 120 mm ²
1,30 m	KSV/50/1,30	KSV/70/1,30	KSV/95/1,30	KSV/120/1,30	KSV/2x120/1,30
1,80 m	KSV/50/1,80	KSV/70/1,80	KSV/95/1,80	KSV/120/1,80	KSV/2x120/1,80
2,00 m	KSV/50/2,00	KSV/70/2,00	KSV/95/2,00	KSV/120/2,00	KSV/2x120/2,00

Connecting Wires

	2,65 m	2,85 m	3,3 m	4,11 m
16 mm ²	AS/16/2,65	AS/16/2,85	AS/16/3,30	AS/16/4,11
25 mm ²	AS/25/2,65	AS/25/2,85	AS/25/3,30	AS/25/4,11
50 mm ²	AS/50/2,65	AS/50/2,85	AS/50/3,30	AS/50/4,11
70 mm ²	AS/70/2,65	AS/70/2,85	AS/70/3,30	AS/70/4,11
95 mm ²	AS/95/2,65	AS/95/2,85	AS/95/3,30	AS/95/4,11
120 mm ²	AS/120/2,65	AS/120/2,85	AS/120/3,30	AS/120/4,11

Further designs upon request.

Connectors can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

RAIL DRILLING MACHINE



Drilling Machine TED „F“ – ZT

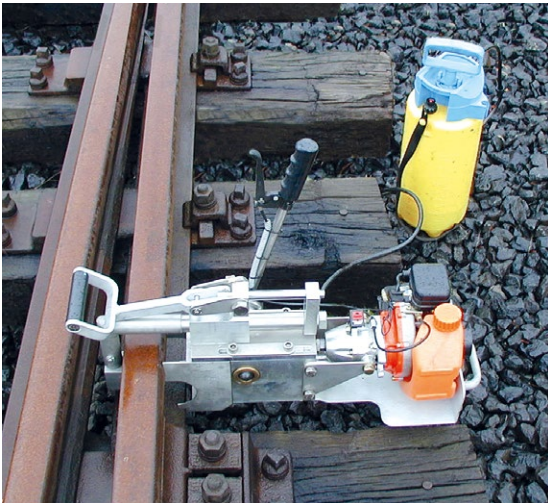
voestalpine SIGNALING drilling machines are used for all rail drillings with diameters up to 36 mm. Using the respective drilling template the resulting rail drilling conformis to the respective regulations of Deutsche Bahn AG.

System features

- » drilling machine with quick-release for fastening over the railhead, or alternatively, under the foot of the rail(crossable by rail vehicle)
- » internal coolant supply
- » electric motor or petrol engine
- » high-performance motor
- » suitable for all rail types
- » maximum drilling diameter 36 mm
- » EBA approved and DB released

SYSTEM ADVANTAGES

- » low weight and easy handling
- » tool-free change of rail drilling templates
- » quick exchange of the milling cutter
- » rail-vehicle-crossable design available
- » high durability



Drilling Machine TED „F“ – ZT

Type	Execution
TED „F“ – ZT	Rail drilling machine, two-stroke execution
TED „F“ – E	Rail drilling machine, electrical execution
TED Frankfurt	Tongue rail drilling machine, electrical execution

Drilling Machine TED „F“ – ZT Petrol Engine



VIDEO
Drilling Machine TED „F“ – ZT
with petrol engine in operation
<https://youtu.be/nmh1REX5xGY>

Drilling Machine TED „F“ – E Electric Motor



VIDEO
Drilling machine TED „F“ – E
with electric motor in operation
https://youtu.be/Fxl_-n4bQPM

DRILLING MACHINE ACCESSORIES

Drilling Templates

Type
» 49E1 (S 49)
» 54E3 (S 54)
» 54E1 (UIC 54)
» 60E1 (UIC 60)
» 59R1 (RI 59) – Innen
» 59R1 (RI 59) – Außen
» 60R1 (RI 60) – Innen
» 60R1 (RI 60) – Außen
Further executions upon request.

Core Hole Cutters

Type
» 13 mm
» 19 mm
» 24 mm

Deburring Tools for Drillings

Type
» deburring tool
» deburring tool for battery-powered drilling machine

Drilling machines and accessories can be ordered directly to specified type contacting
Sales.Sainerholz@voestalpine.com or calling **+49/2666/9520-100**

CABLE LUGS



Cable lug

Cable lugs are used for electrical cable connections by means of bolts. Beside others, they are used in case of large wire sections utilised in the rail sector (aluminium or copper conductors).

System features

- » cable lugs as per DIN 46235 standard
- » suitable for single- or multi-wired, and fine or extra-fine conductors
- » made of electrolyte copper, tin-plated as standard

SYSTEM ADVANTAGES

- » easy pressing operation
- » clean results
- » maximum conductivity
- » system supplier

Cable diameter	Bolt diameter	Type
25 mm ²	M 12	PKS 25-12
35 mm ²	M 12	PKS 35-12
50 mm ²	M 12	PKS 50-12
50 mm ²	M 16	PKS 50-16
70 mm ²	M 12	PKS 70-12
70 mm ²	M 16	PKS 70-16
95 mm ²	M 12	PKS 95-12
95 mm ²	M 16	PKS 95-16
120 mm ²	M 12	PKS 120-12
120 mm ²	M 16	PKS 120-16
150 mm ²	M 12	PKS 150-12
150 mm ²	M 16	PKS 150-16
Version made of aluminium available upon request!		

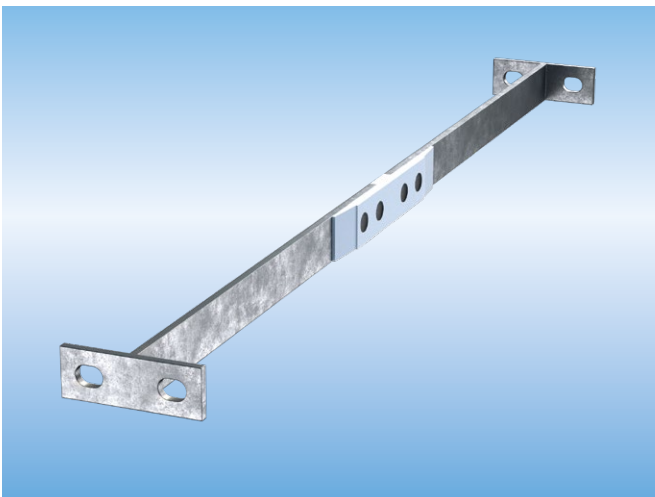
Cable lugs can be ordered directly to specified type contacting Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

INSULATED GAUGE BARS

Insulated gauge bars maintain the track gauge without causing an electrical connection between the rails. They are e.g. used in track blocking circuits.

System features

- » for all track gauges and rail types
- » straight or offset cranked
- » weldable or screwable variants available
- » special designs possible upon request
- » available standard types:
 - » stray-current insulated gauge bar with GRP coating
 - » rail-to-rail insulation by insertion of special plastic
 - » fully insulated gauge bar: rail-to-rail plus stray current insulation
- » standard designs available ex stock at short notice



Insulated gauge bar



Insulated gauge bars in track

SYSTEM ADVANTAGES

- » extremely robust
- » high degree of insulation
- » maximum of functional reliability
- » completely coated

Type	Material thickness	Variants	Length in mm
One insulating plate	70x10	Straight / offset cranked	Available for all track gauges
One insulating plate, fully insulated	70x10	Straight / offset cranked	Available for all track gauges
Two insulating plates, fully insulated	70x10	Straight / offset cranked	Available for all track gauges

Insulated gauge bars can be ordered directly to specified type contacting Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100

LINESIDE BOXES



Lineside box

SYSTEM ADVANTAGES

- » protected against weather and mechanical damage
- » assuring system's availability
- » easy installation
- » suitable for service in all areas (cobblestones, asphalt, concrete, lawn, etc.)

Lineside boxes are designed to protect cable connections. Furthermore, they allow for easy future access to such connections. Designed in close cooperation with our customers there are more than 250 different lineside boxes in service worldwide. These variants, made of stainless steel, have proven particularly valuable over recent decades.

System features

- » made of either stainless or hot-dip galvanised steel
- » suitable for any rail sections utilising the respective section adapting plates
- » watertight
- » corrosion resistant
- » stray current insulated variants available upon request
- » high load stability, variants acc. to load class D400 made of Hardox steel available upon request
- » electrical and mechanical connections separated as per VDE standards
- » high electric conductivity due to use of conical threaded bolts made of stainless steel

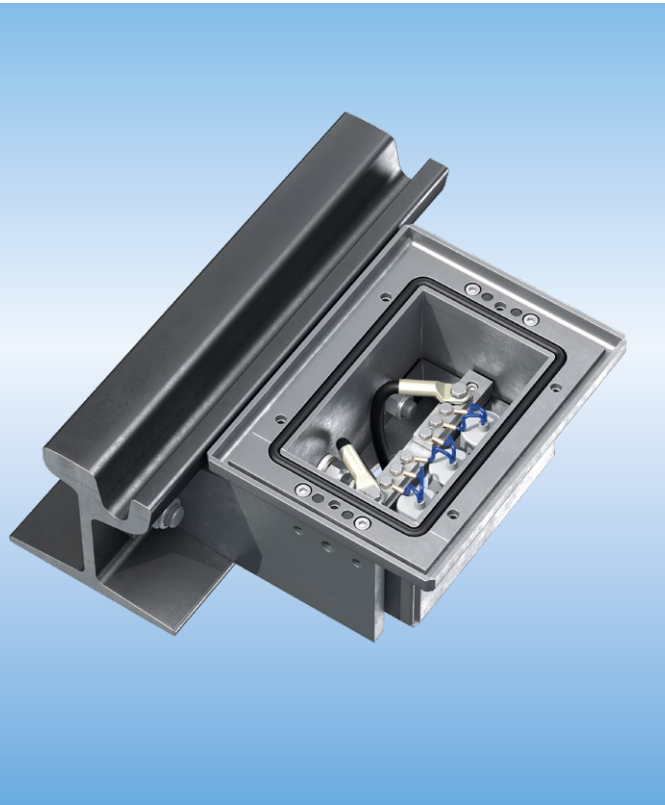


Lineside Box mounted

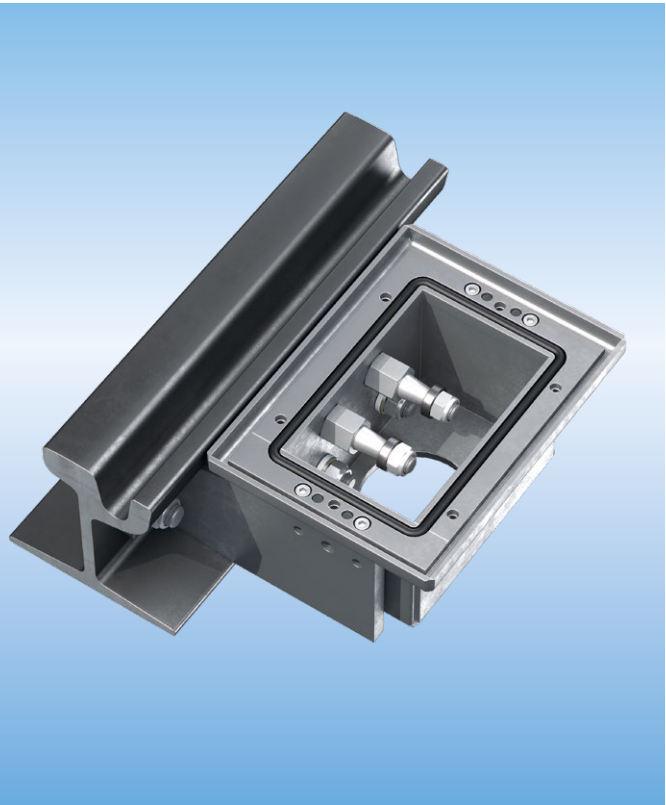


Lineside Boxes for track blocking circuit applications

Capacitor Box Variant



Design for Return Current Connection



Designation	Type of rail	Cable entry	Pipe socket
Capacitor box	z.B.: 59R1, 60R1, 57R1, 49E1, 54E3, 54E1, 60E1, ...	2xPG21	48 mm or 70 mm flange
Return current connection box	z.B.: 59R1, 60R1, 57R1, 49E1, 54E3, 54E1, 60E1, ...	-	100 mm
Further variants upon request.			

Lineside boxes can be ordered directly to specified type contacting Sales.Sainerholz@voestalpine.com or calling +49/2666/9520-100



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voestalpine

ONE STEP AHEAD.