KLK

Committed to service

Cable/Rail Welding

Rail Exothermic Welding

The **ELPA welding procedures** ensure the creation of **molecularly perfect connections,** allowing rail joints without compromising their structural integrity. The **ELPA welding system stands for SAFETY.**

www.klk.es

#weareKLK

KLK Electro Materiales operates across all five continents, serving clients in over 30 countries.

KLK Electro Materiales is a provider of equipment for the industrial and energy sectors. Established in 1965, we bring over fifty years of experience in delivering technical solutions to both national and international clients in demanding and competitive markets.

Since 2022, KLK has been part of the French Novarc Group, a global leader in energy, telecommunications, security, and installations solutions. Currently, we stand as the foremost national supplier in electrical installation safety across high, medium, and low voltage. Additionally, we are a key player in grounding solutions in Europe, with a strong presence in Latin America and the Middle East.

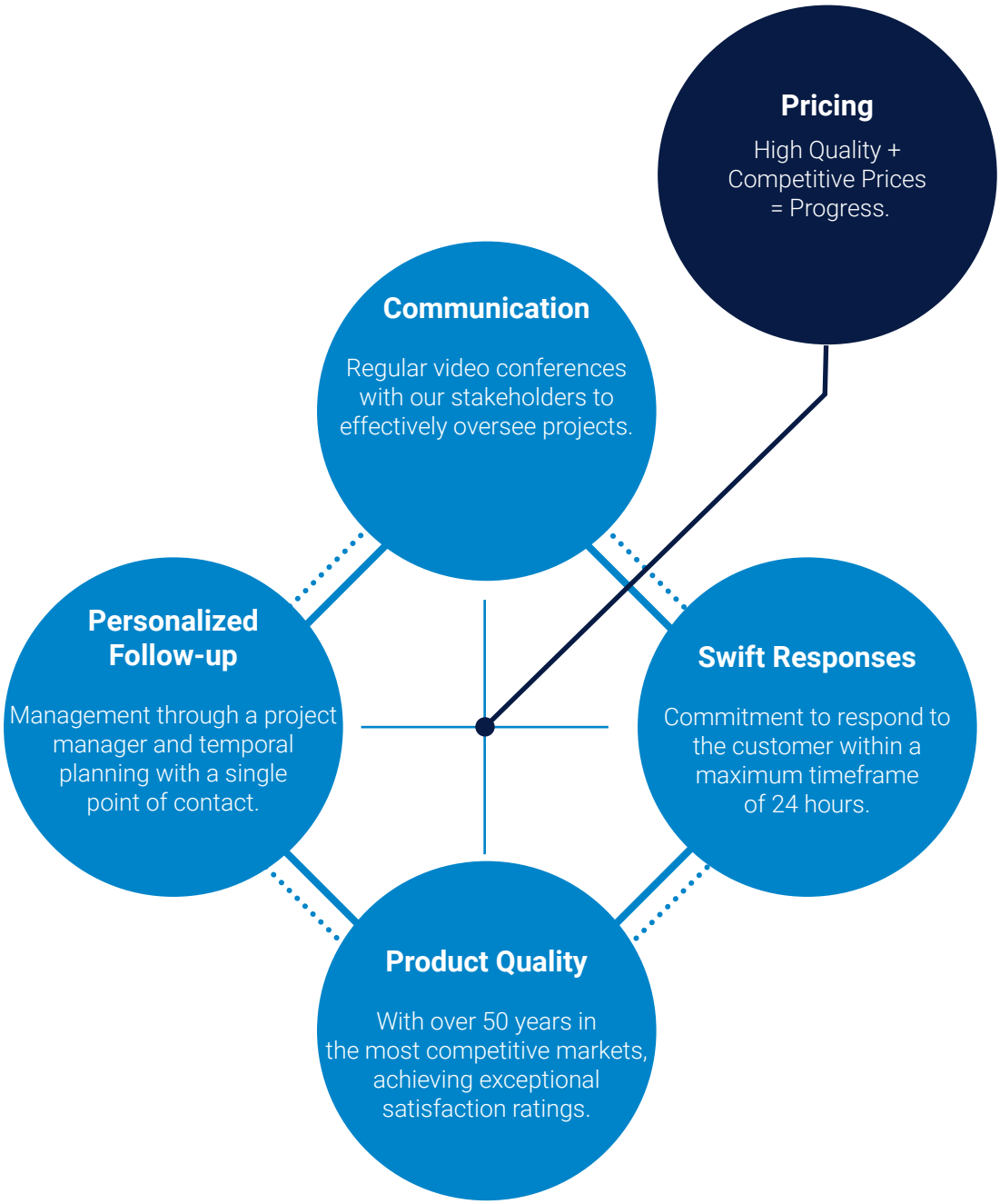
KLK is a leading company with a specialized division, KLK Weld, dedicated to the production and commercialization of grounding materials and aluminothermic welding. We have gained undeniable prestige in mature sectors such as railways, both nationally and internationally.

To complement our product range, KLK offers a comprehensive line of services through KLK Tech, designed to provide holistic solutions to our customers. Our services include specialized training at various levels, post-sales technical support, and personalized advice.

With a commitment to quality, innovation, and service excellence, KLK has established itself as a benchmark in the market, becoming the preferred choice for professionals and companies seeking reliable and high-performance solutions in the field of grounding and aluminothermic welding.

novarc NETWORKS

KLK Commitment



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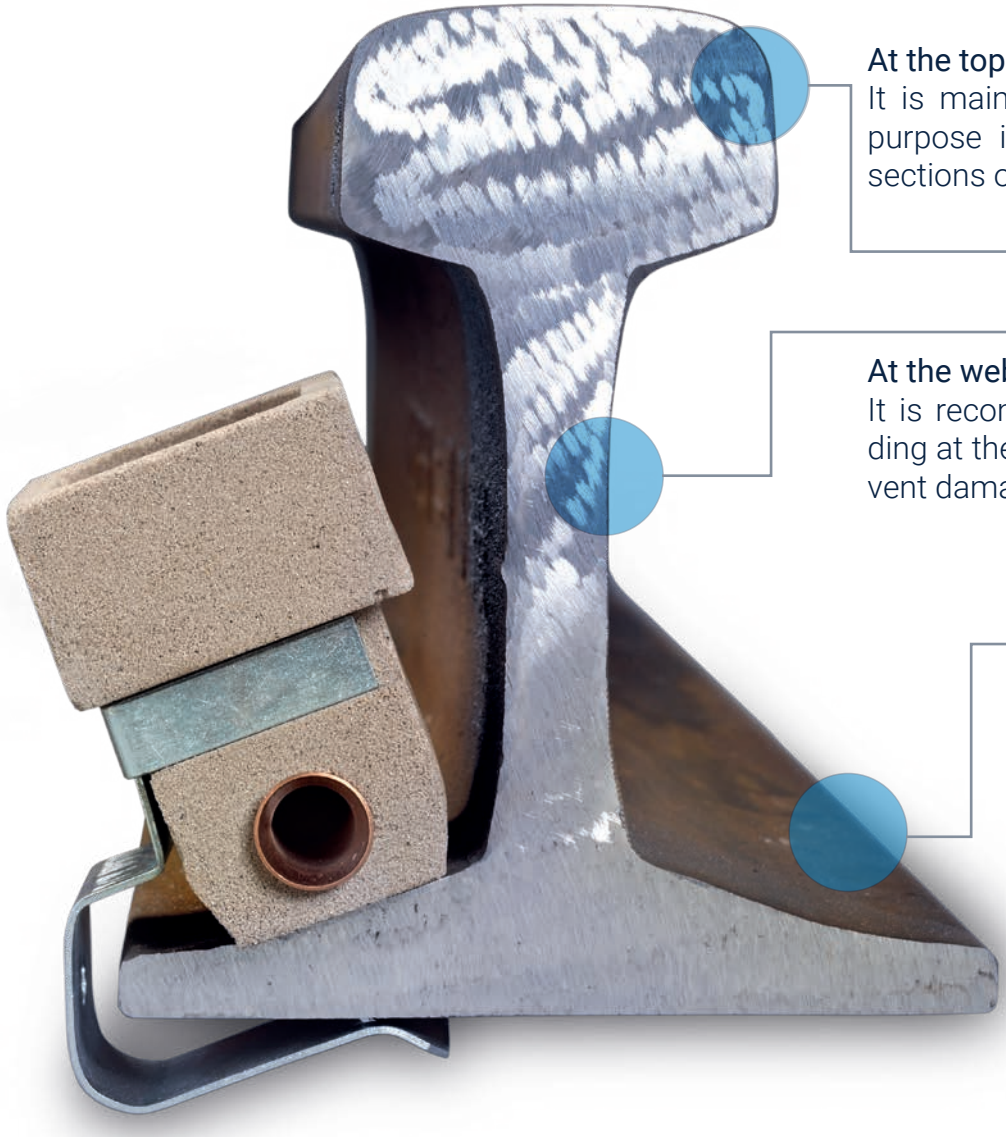
Connections



At the top:
It is mainly done through clamps. The purpose is to electrically connect two sections of rail mechanically joined.

At the web:
It is recommended to perform the welding at the midsection of the web to prevent damage to the rail.

At the flange:
It is the simplest and most convenient connection to make. In this case, both graphite and one-time-use sand molds can be used. The latter option is highly recommended as it involves an indirect welding process that does not impact the rail's steel.

RAIL CONNECTIONS BY KLK WELD

The railway sector, an essential component of modern transportation, stands out for its mobility, speed, safety, and sustainability. Electrical connections in the railway are crucial for maintaining the efficiency of the networks. Exothermic welding is a highly effective solution for creating strong and durable electrical connections.

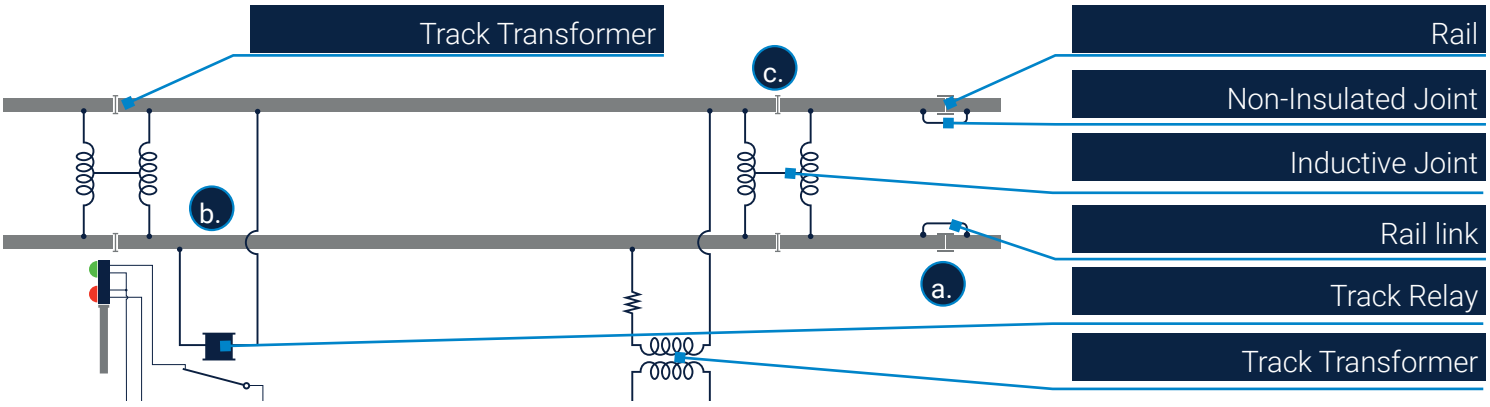
Copper or aluminum conductors play a key role in Track Connections, connecting to the rails for technical functions in systems that complement railway traffic.

These conductors are used in:

a. Electrificación: They ensure the return of traction current in electrified lines with discontinuous rail, in switch zones, and expansion devices.

b. Safety and Signaling Installations: They guarantee the electrical continuity of track circuits with discontinuous rail, supplying and outputting the current.

c. Mixed Connections: They provide continuity to the traction return current through inductive joints in electrified lines. They ensure reliable operation for railway traffic.



TIP TOP ELPA KLK-weld: Universal **connection** on any track, **without impacting steel quality**, fully meeting the technical specifications of major railway companies.

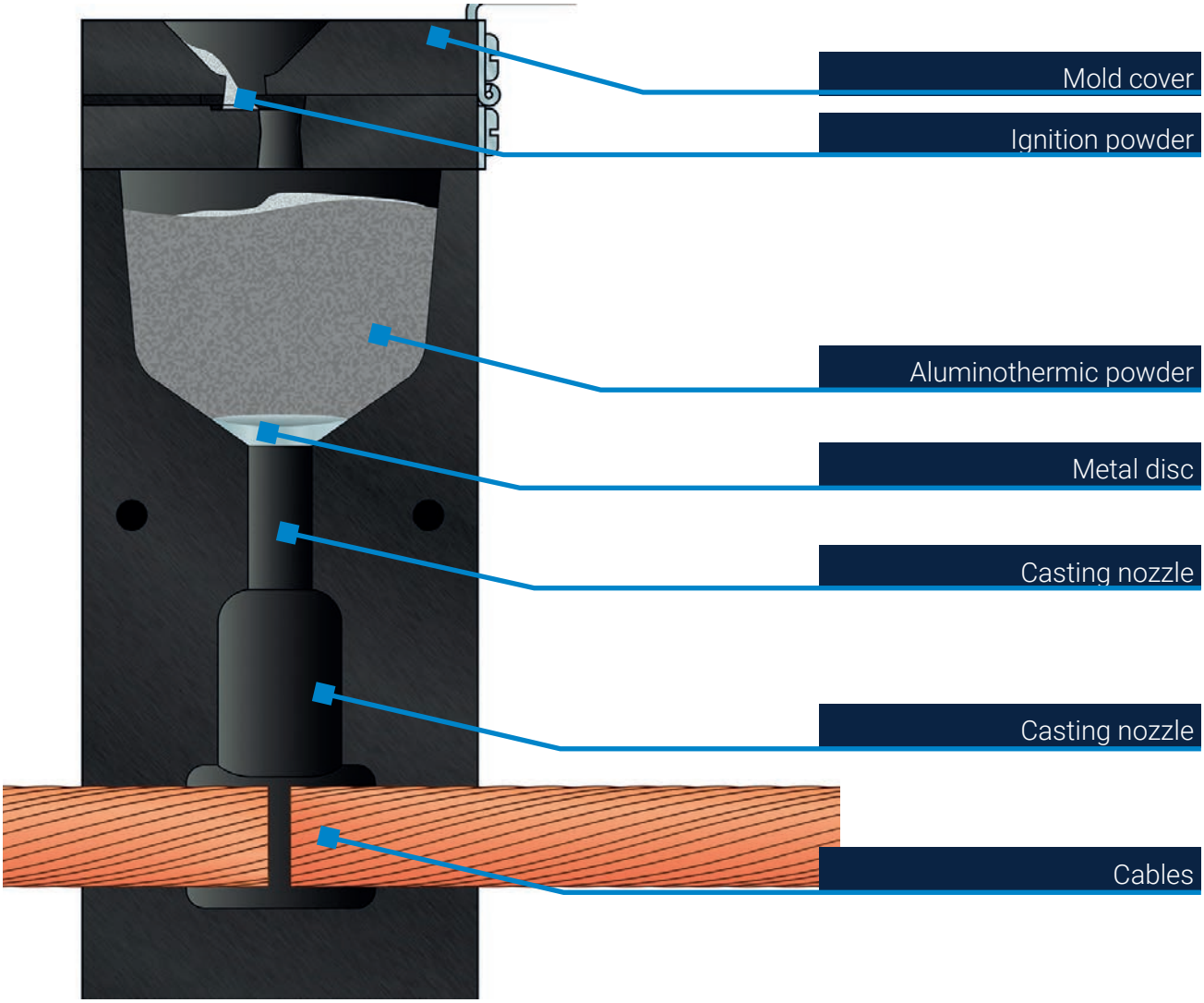
KLK Weld Procedure

The KLK Weld aluminothermic welding procedure is an exothermic reaction involving the reduction of copper oxide by aluminum.

The fundamental

$$3\,CuO + 2\,Al \rightarrow Cu + Al_2O_3 + Heat$$

COPPER OXIDE + ALUMINUM + ALLOYS → COPPER + ALUMINUM OXIDE + HEAT



MOLD´S TYPES

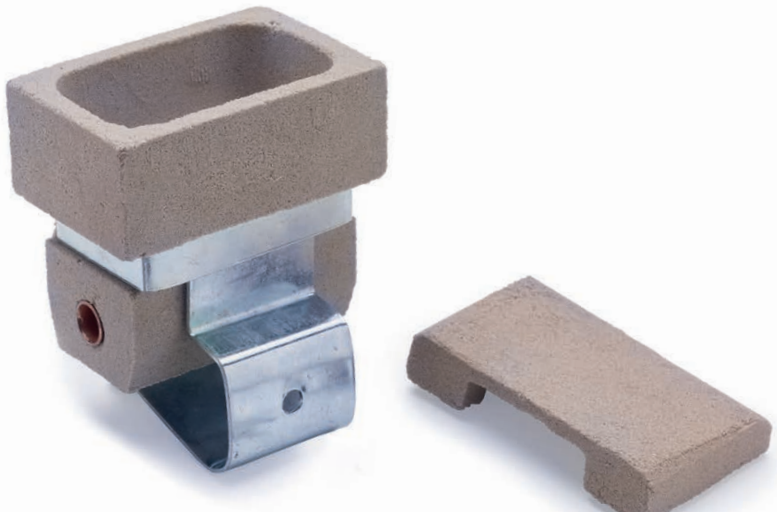
The reaction takes place inside a mold made entirely of high-quality graphite, with a certain number of uses throughout its entire lifespan. There is also the option of using a sand mold, with the latter being single-use.

This process is carried out in a controlled environment, and the choice between the types of rail connections is crucial depending on the specific connection to be made.

TIP TOP Did you know that with **ELPA molds, it is possible to use our LsVip** remote connection cover?

Graphite Mold

KLK WELD weld



Elpa´s Mold

KLK WELD weld

KLK Weld Procedure

CARTRIDGES

Heat generated in the exothermic reaction, without using any other external energy source, melts the metals contained in the crucible.

The disk obturator serves a triple function:

1. Retaining the powder before ignition.

2. Allowing a homogeneous chemical reaction before casting.

3. Ensuring separation between the slag (aluminum oxide) and the denser molten metal (copper).

The temperature achieved (over 2,500°C) surpasses the melting point of metals such as copper, steel, brass, bronze, etc. The elements to be welded, previously introduced into the welding chamber, are fused by the heat provided by the liquefied metal. The result is a mechanical and electrical connection made of an alloy composed of the different metals resulting from the fusion.

Due to the intra-molecular structure, this connection presents numerous advantages:

1. Resistant to corrosion.
2. Superior electrical characteristics compared to other types of mechanical connections.
3. Optimal mechanical characteristics.
4. No dielectric influence due to different types of metals.

Cartridges

KLK WELD weld

MOLD TYPE	C-15	C-25	C-32	C-45	C-65	C-90	C-115	C-150	C-200	C-250
COLOR	Light gray	Dark gray	Purple	White	Yellow	Orange	Red	Brown	Blue	Green
UNIT/BOX	20	20	20	20	10	10	10	10	10	10

EQUIPMENT KLK WELD

The **KLK-WELD equipment** is lightweight and portable, requiring no external power source. Therefore, it is ideal for on-site use. Specialized personnel* are required to achieve optimal electrical connections with high mechanical quality in a very short time.

TIP TOP: Did you know that KLK has a professional school to train and certify welders?
***www.klk.xchool.es**

Molds
The molds are machined from a block of refractory material (graphite).

Wire Brush
Used for proper cleaning of the cables to be used.

Brush
For cleaning the interior of the mold after each welding.

Ignition Gun
Used for igniting the ignition powder.
Accepts regular lighter flints as a replacement.deignición.

RR Scraper
Its shape is specially designed for cleaning the charging hopper of the RR-type mold.

R Scrape
Its shape is specially designed for cleaning the charging hopper of the mold.Types: R-45, R-90, R-150, R-750.

Sealing Rod.
Strands of refractory paste used to prevent loss of molten copper between the mold walls and the conductors to be welded.

Remote Ignition Device.
A system used to safely and cleanly ignite the charge.

Long Ignition Consumable.
Used for ignition with the remote ignition device.

CLAMPS

The tongs used for cable-rail welds are designed to secure the mold to the rail in each specific case. The fixing mechanism is adjustable to fit perfectly with each type of rail, and the molds can be replaced easily and quickly.

TIP TOP: To prevent losses of molten metal, it is recommended to apply sealing paste to the mold after closing the tongs in certain specific types of connections.

Clamp TRA-D, SDRR*, TRA/V-16**

Clamp SMRTC, MS.

Clamp TRA-C,SLT*, TRA/V-17**.

Clamp TSC-80

Clamp TRA-P, SLP-SEI

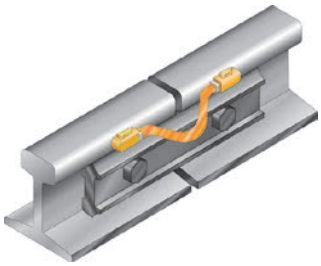
Clamp TRA-A, SMRLC

*According to the standard S.N.C.F
**According to the standard RENFE

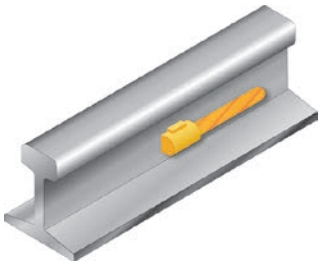
TYPES OF CONNECTION

ELPA

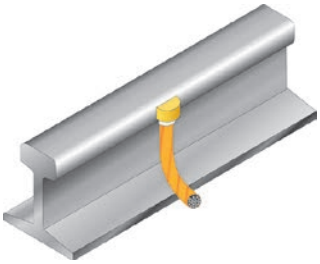
CRA-CRR
(MRR*)



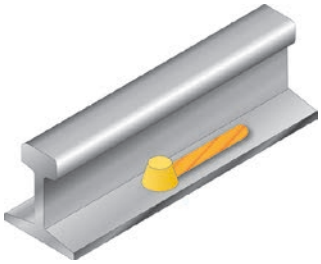
CRA-TA
(MRLA*)



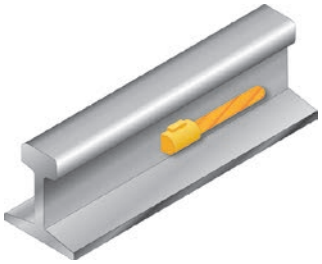
CRA-TC
(MLT*)



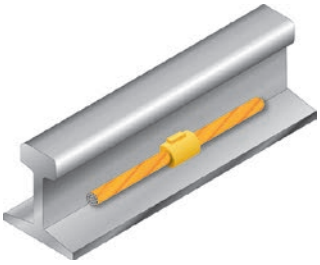
CRA-TP



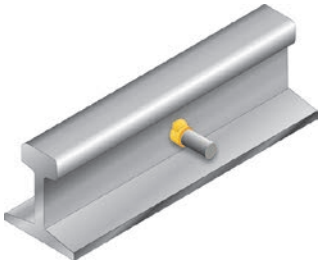
CRA-TH



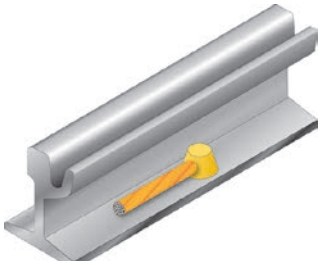
CRA-PH



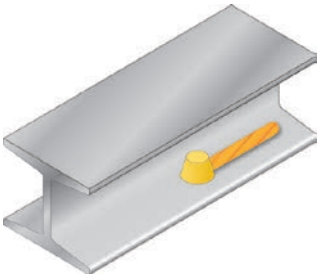
BRA-V



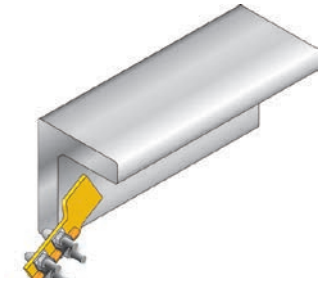
SEI



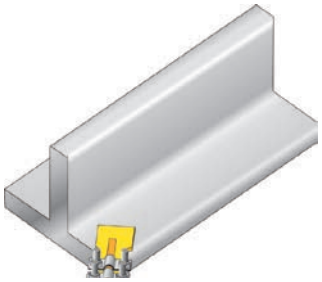
SEI/PR



MRLC



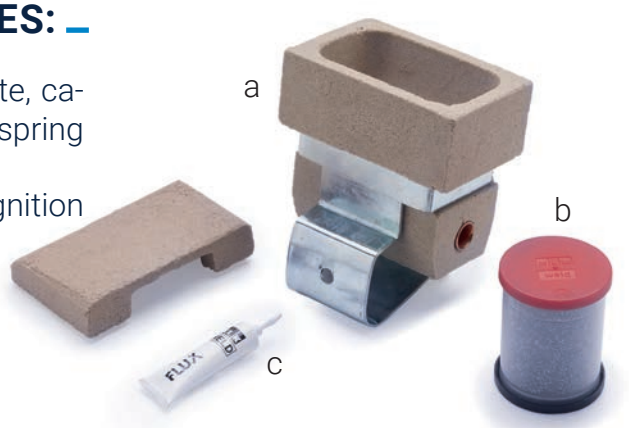
MRTC



***According to the standard S.N.C.F**

THE ELPA KLK WELD KIT INCLUDES:

a. Ceramic mold incorporating a steel plate, cable entry sleeve, sealing disk, cover, and spring clip.
b. Aluminothermic powder cartridge and ignition for welding.
c. Flux dose.
d. User guide..



KLK KITS ELPA

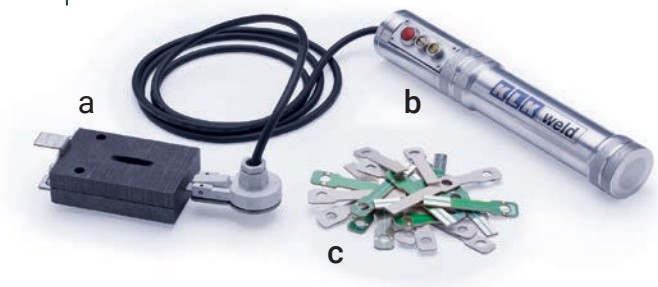
The ELPA KLK Weld kits are manufactured for cable sections ranging from 10 to 240 mm² and are usable with most rail profiles, including AREA, BS, UIC, U, S, RN, etc. Examples of possible kits are as follows:

DENOMINATION	APPLIC*	S.N.F.C
Kit ELPA 10	Cable de cobre 10 mm² (Ø4,05 mm)	
Kit ELPA 35	Cable de cobre 35 mm² (Ø7,6 mm)	0.393.1209.5
Kit ELPA 50	Cable de cobre 50 mm² (Ø9,2 mm)	
Kit ELPA 70	Cable de cobre 70 mm² (Ø10,9 mm)	0.393.1210.3
Kit ELPA 95	Cable de cobre 95 mm² (Ø12,6 mm)	0.393.1211.1
Kit ELPA 120	Cable de cobre 120 mm² (Ø14,3 mm)	
Kit ELPA 150	Cable de cobre 150 mm² (Ø15,6 mm)	
Kit ELPA 185	Cable de cobre 185 mm² (Ø17,6 mm)	0.393.1212.9
Kit ELPA 240 R	Cable de cobre 240 mm² (Ø20,0 mm)	
Kit ELPA 240 F	Cable de cobre 240 mm² (Ø23,0 mm)	
Kit ELPA 12	Bulón Ø12 mm (**)	

(*) Consult in case of other cross-sections and/or diameters.
(**) The bolt can also be welded to aluminum cable or be part of a CuAl bimetallic terminal.

There is the possibility of **using the LsVIP KLK Weld ignition procedure**, which prevents the projection of sparks outside the mold, reduces smoke emissions, and allows remote ignition. The following elements are required for this:

a. Cover ELPA LsVIP.
b. Remote Ignition Device.
c. Fuses (one unit for each ignition)..

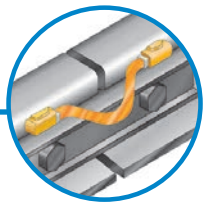


NORMALIZED CABLE/RAIL WELDS.

Each railway administration has standardized its own connections, among all possible solutions, to ensure the electrical traction continuity. Aluminothermic welding is the most commonly used method to weld these connections to the rail. **Renfe has standardized, in accordance with E.T 03.364.005.3.**

Aluminothermic welding is the most widely used method for welding these connections to the rail. Renfe has standardized, in accordance with E.T 03.364.005.3., the following two types of connections: **V-16** & **V-17**

Connection type V-16

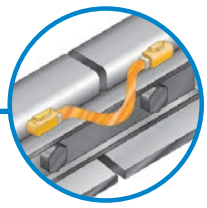


CONNECTION 50MM²		MOLD TYPE	CARTRIDGE	CLAMP
V-16	Longitud: 225 mm	CRA-CRR V-16	C-45R	TRA/V-16

Connection type V-17

CONNECTION 139MM²		MOLD TYPE	CARTRIDGE	CLAMP
V-17	Longitudes: 700, 2.400 y 2.800 mm	CRA-TC V-17	C-90R	TRA/V-17

Railhead Flange Connection
CRA-CRR (MMR*)



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
35	MRR 35*	C-32 R	SDRR	RR
50	MRR 50*	C-45 R	SDRR	RR
70	MRR 70*	C-65 R	SDRR	RR
95	MRR 95*	C-65 R	SDRR	RR
120	MRR 120*	C-115 R	SDRR	RR
150	MRR 150*	C-150 R	SDRR	RR

Add to the mold reference: (R) - Right-hand mold. (L) - Left-hand mold. It is essential to know the rail type or profile for a perfect mold adaptation.

*According to the standard S.N.C.F

Connection Flanges

CONNECTION 50MM²	
RR-50	Length: 185 mm

CONNECTION 95MM²	
RR-95	Lenght: 175 mm
RR-95-R	Lenght: 285 mm
RR-95-L	Lenght: 405 mm

CONNECTION 120MM²	
RR-120	Lenght: 175 mm

Códigos S.N.C.F. de la conexión MRR.

REF.	S.N.C.F.	
MRR-50G	7.393.4923.1	0.002.4923
SDRR-50	7.393.4939.7	0.110.4939
C-45R	7.393.4950.4	0.005.0005
MRR-95G	7.393.4921.5	0.002.4921
SDRR-95	7.393.4935.5	0.110.4935
C-65R	7.393.5842.2	0.005.0006
RR-95L	7.952.0691	0.010.0311
MRR-120G		0.002.4016
SRR-120		0.110.4016

REF.	S.N.C.F.	
MRR-50D	7.393.4924.9	0.002.4924
SRR-50		0.110.4013
RR-50	7.952.0694	0.010.0300
MRR-95D	7.393.4922.3	0.002.4922
SRR-95	7.393.4936.3	0.110.4936
RR-95	7.952.0690	0.010.0310
RR-95R		0.010.0315
MRR-120D		0.002.4116
C-115		1.005.0008

Terminal Cable Connection on Rail Head CRA-TC (MLT*)

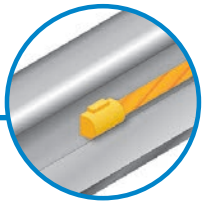
SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	EMBOSSIN	DIES	SCRAPER
35	MLT-35*	C-65 R	SLT-75	E-35	ME-75+MPO	R-45
75	MLT-75*	C-65 R	SLT-75	E-75	ME-75+MPO	R-45
185	MLT-185*	C-90 R	SLT-185	E-185	ME-185+MPO	R-90
35	CRA-TC 35	C-45	TRA-C			
50	CRA-TC 50	C-65	TRA-C			
70	CRA-TC 70	C-65	TRA-C			
95	CRA-TC 95	C-90	TRA-C			
120	CRA-TC 120	C-115	TRA-C			

Knowing the rail type or profile is essential for a perfect adaptation of the mold. Use sealing paste. S.N.C.F. codes for the MLT connection.
*According to the standard S.N.C.F

REF.	S.N.C.F.	
MLT-75	7.393.4932	0.002.4932
C-65R	7.393.5842.2	0.005.0006
SLT-75	7.393.4940	0.110.4940
ME-75	7.393.6192	0.010.6192
MPO	7.393.6190	0.010.6190
E-75	7.952.0695	0.010.0695
E-35	7.952.0742	0.010.0742

REF.	S.N.C.F.	
MLT-185	7.393.4930	0.002.4930
C-90R	7.393.4951	0.005.0007
SLT-185	7.393.4936	0.110.4936
ME-185	7.393.4962	0.010.4962
MPO	7.393.6190	0.010.6190
E-185	7.952.0693	0.010.0693

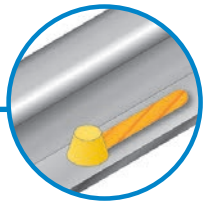
Terminal Cable Connection on Web CRA-TA (MRLA*)



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
35	MRLA 35*	C-45	TRA-A	R-45
50	MRLA 50*	C-65	TRA-A	R-45
70	MRLA 70*	C-90	TRA-A	R-90
95	MRLA 95*	C-90	TRA-A	R-90
120	MRLA 120*	C-115	TRA-A	R-90
150	MRLA 150*	C-150	TRA-A	R-150

To add to the mold reference: (R) - Right-hand mold. (L) - Left-hand mold. It is essential to know the rail type or profile for a perfect mold adaptation. Use sealing paste.
*According to the standard S.N.C.F

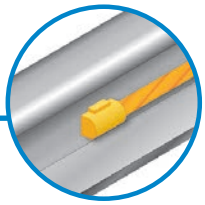
Terminal Cable Connection on Flange CRA-TP



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
35	CRA-TP 35	C-45	TRA-P	R-45
50	CRA-TP 50	C-65	TRA-P	R-45
70	CRA-TP 70	C-65	TRA-P	R-45
95	CRA-TP 95	C-90	TRA-P	R-90
120	CRA-TP 120	C-115	TRA-P	R-90
150	CRA-TP 150	C-115	TRA-P	R-90

"Add to the mold reference: (R) - Right-hand mold. (L) - Left-hand mold. It is essential to know the rail type or profile for a perfect mold adaptation. Use sealing paste.

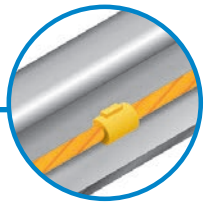
Terminal Cable Connection on Web/Flange CRA-TH



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
35	CRA-TH 35	C-65	TSC-80	R-45
50	CRA-TH 50	C-65	TSC-80	R-45
70	CRA-TH 70	C-90	TSC-80	R-90
95	CRA-TH 95	C-115	TSC-80	R-90
120	CRA-TH 120	C-150	TSC-80	R-150
150	CRA-TH 150	C-150	TSC-80	R-150

Add to the mold reference: (R) - Right-hand mold. (L) - Left-hand mold. It is essential to know the rail type or profile for a perfect mold adaptation. Use sealing paste.

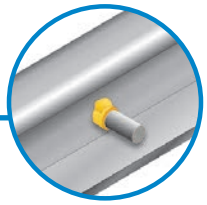
Terminal Cable Connection on Web/Flange
CRA-PH



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
35	CRA-PH 35	C-90	TSC-80	R-90
50	CRA-PH 50	C-90	TSC-80	R-90
70	CRA-PH 70	C-115	TSC-80	R-90
95	CRA-PH 95	C-150	TSC-80	R-150
120	CRA-PH 120	C-200	TSC-80	R-150
150	CRA-PH 150	C-200	TSC-80	R-150

It is essential to know the rail type or profile for a perfect mold adaptation. Use sealing paste.

Threaded Bolt Connection to Web
BRA-V

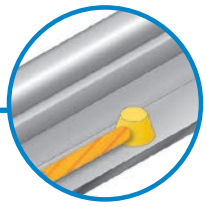


THREAD	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
M 10	BRA-V-M10	C-65	TSC-80	R-45
M 12	BRA-V-M12	C-90	TSC-80	R-90
M 16	BRA-V-M16	C-115	TSC-80	R-90

It is essential to know the rail type or profile for a perfect mold adaptation.

SEI Grooved Rail Cable Connection

SEI

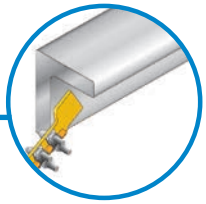


SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
10	SEI-10	C-45	SLP-SEI	RR
16	SEI-16	C-45	SLP-SEI	RR
25	SEI-25	C-45	SLP-SEI	RR
35	SEI-35	C-45	SLP-SEI	RR
50	SEI-50	C-45	SLP-SEI	RR
70	SEI-70	C-65	SLP-SEI	RR
95	SEI-95	C-90	SLP-SEI-240	RR
120	SEI-120	C-115	SLP-SEI-240	RR
150	SEI-150	C-115	SLP-SEI-240	RR
185	SEI-185	C-150	SLP-SEI-240	RR
240	SEI-240	C-200	SLP-SEI-240	RR

Add to the mold reference: (R) - Right-hand mold. (L) - Left-hand mold. It is essential to know the rail type or profile for a perfect mold adaptation. Use sealing paste.

L-Shaped Rail Cable Connection

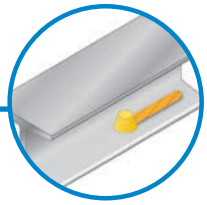
MRLC



SECTION MM²	MOLD TYPE →	MOLD TYPE ←	MOLD TYPE ↓	CARTRIDGE	CLAMP	SCRAPER
35	MRLC-35X8I	MRLC-35X8D	MRLC-35X8V	C-115	SMRLC-G SMRLC-D SMRLC-V	R-45
50	MRLC-50X8I	MRLC-50X8D	MRLC-50X8V	C-115		R-45

It is essential to know the rail type or profile for a perfect mold adaptation.

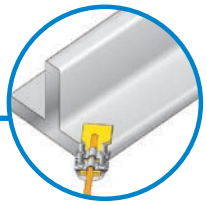
Cable Connection on Running Surface SEI-PR



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
10	SEI-10/PR	C-45	SLP-SEI	RR
16	SEI-16/PR	C-45	SLP-SEI	RR
25	SEI-25/PR	C-45	SLP-SEI	RR
35	SEI-35/PR	C-45	SLP-SEI	RR
50	SEI-50/PR	C-45	SLP-SEI	RR
70	SEI-70/PR	C-65	SLP-SEI	RR
95	SEI-95/PR	C-90	SLP-SEI-240	RR
120	SEI-120/PR	C-115	SLP-SEI-240	RR
150	SEI-150/PR	C-115	SLP-SEI-240	RR
185	SEI-185/PR	C-150	SLP-SEI-240	RR
240	SEI-240/PR	C-200	SLP-SEI-240	RR

Add to the mold reference: (D) - Right-hand mold. (I) - Left-hand mold. It is essential to know the rail type or profile for a perfect mold adaptation. Use sealing paste.

T-Shaped Rail Cable Connection MRTC



SECTION MM²	MOLD TYPE	CARTRIDGE	CLAMP	SCRAPER
35x8	MRTC-35x8	C-115	SMRTC	R-45
50x8	MRTC-50x8	C-150	SMRTC	R-45

Add to the mold reference: (D) - Right-hand mold. (I) - Left-hand mold.

Rail Welding Clamp for ‘T’ or ‘L’ Connection

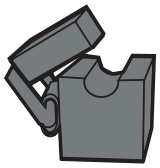
REF.	SECCTION
2BC312	25–150

For other dimensions, consult us.

Embossing, Molds, and Dies

E-10
E-35
E-75
E-95
E-185
E-240

Copper Embossing



ME-75 + MPO
ME-185 + MPO
ME-240 + MPO

Dies for Embossing

TIP TOP: Do you need a different connection that you can’t find in the catalog?

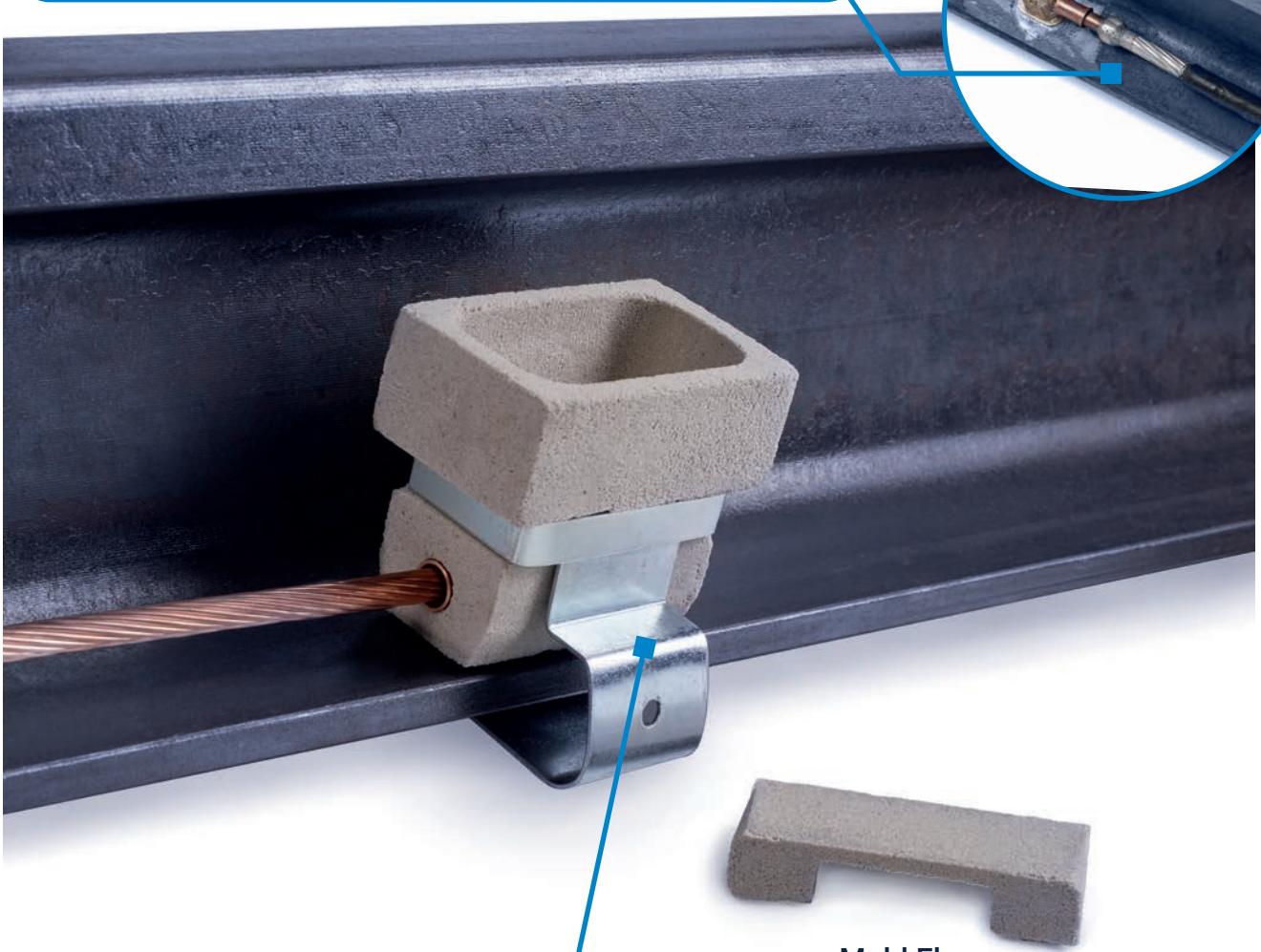
Save time and enhance the productivity of the welding professional by consulting with our customer service team.

ELPA WELDING PROCEDURE

The ELPA KLK Weld welding procedure is the best solution for making electrical connections from copper cable to the rail flange, achieving low electrical resistivity and high mechanical strength in the connection, all without affecting the rail steel, as the temperature never exceeds 600°C.

TIP TOP: Did you know that you can make connections with copper or aluminum cable outputs using the **Elpa** + **inDuo**[AL]* equipment, achieving a perfect non-destructive connection?"

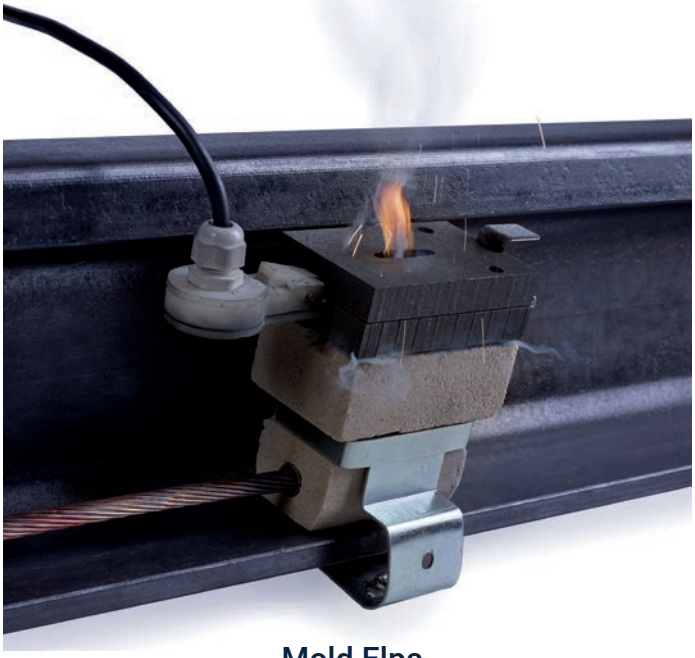
*Discover inDuo[AL]



Our connection using the 'CLIP', patented by KLK, achieves a perfect and snug connection for all types of rails.

Mold Elpa

KLK WELD weld

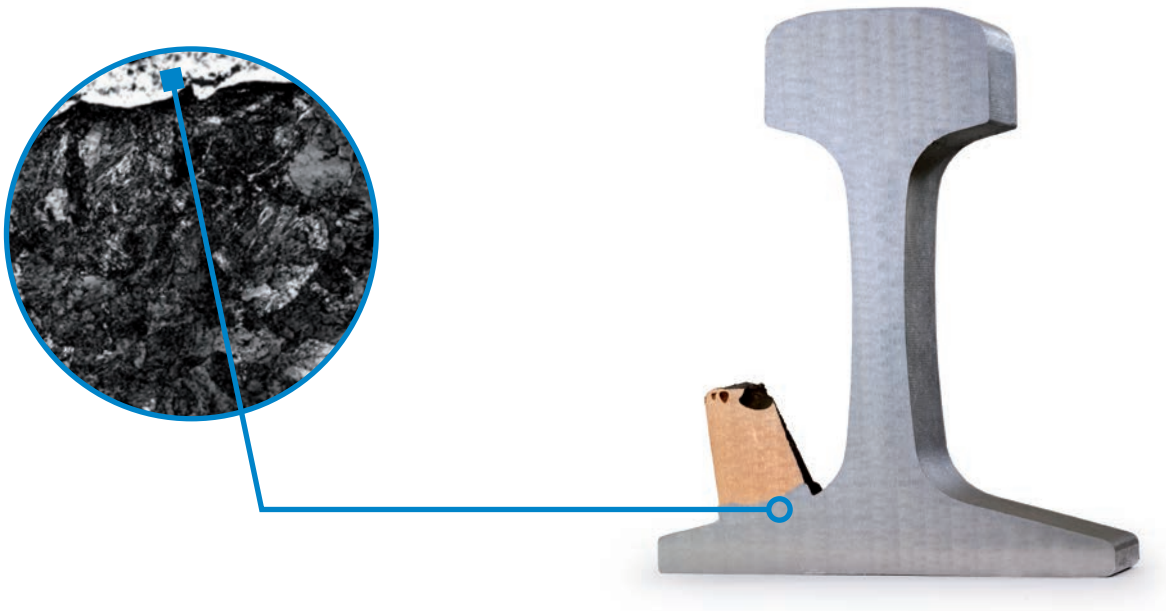


Mold Elpa

KLK WELD weld

The ELPA KLK Weld procedure combines aluminothermic welding processes with tin-silver capillary welding, allowing the latter to harness some of the heat generated in the former. A ferritic steel plate is placed between the conductor cable and the rail pad, absorbing the thermal impact of the aluminothermic pour, and the plate becomes welded to the cable end. Since the plate incorporates a tin-silver alloy on the side in contact with the rail, the final bond between the plate and the rail occurs as a result of the combination of the heat that melts this alloy and the force of a spring-clip that presses the plate against the rail during the solidification process.

TIP TOP: Unlike other welding procedures, the **ELPA KLK Weld procedure does not affect the rail steel**. Through microscopic analysis, we confirm that the capillary welding connection between the plate and the rail maintains the structure of the rail steel unchanged, entirely pearlitic, and free from microcracks.



RAIL CONNECTIONS WITH ALUMINUM: ELPA + inDuo [AL]

The connections of **aluminum cable to the rail pad are carried out through the innovative combination** of the **InDuoAL and ELPA welding procedures**. Our method for integrating both systems provides an advanced solution that allows seamless joints for aluminum feeders.

The **fusion of these procedures completely eliminates the need for mechanical connections** between the elements to be joined. This absence of mechanical elements not only simplifies the process but also ensures greater efficiency and reliability in the connection, thus establishing a higher standard in the performance and durability of railway connections. **This connection method is our solution that positions the patented KLK Electro materials** system as a leading technical solution in the industry, delivering exceptional **results and robustness in the implementation of aluminum cable connections to the rail pad.**

Examples ELPA + inDuo[AL]

KLK WELD

	Welding Aplications (**)				Examples		
DENOMINATION	**DE**	**A**	**ø(mm) (**)**	**CARRIL**	**DENOMINATION ELPA**	**PROCEDURE 1 INDUO[AL]**	**PROCEDURE 2 ELPA**
Kit inDuo [AL] d12 - cu11	11,1	12	11/9	Rail pad	Kit Elpa d9	Aluminium cable 95mm2 (ø11,5mm) Embossing (extremo ø11mm)	Bolt (end ø9mm) to rail pad.
Kit inDuo [AL] d13 - cu12	12,1	13	12/10	Rail pad	Kit ELPA d10	Aluminum cable 120mm2 (ø12.7mm) Bolt (end ø12mm)	Bolt (end ø10mm) to rail pad.
Kit inDuo [AL] d14 - cu13	13,1	14	13/11	Rail pad	Kit ELPA d11	Aluminum cable 150mm2 (ø13.6mm) Bolt (end ø13mm)	Bolt (end ø11mm) to rail pad.
Kit inDuo [AL] d18 - cu18	17,1	18	18/14	Rail pad	Kit ELPA d14	Aluminum cable 240mm2 (ø18.0mm) Bolt (end ø18mm)	"Bolt (end ø14mm) to rail pad."

Elpa Carril is the welding system designed and intended for both connecting through a crimped bimetallic terminal or using our InDuo system by previously welding the aluminum feeder cable to the copper bolt, thus **avoiding a weak mechanical joint.**

inDuo[AL] at QR. code

***Aluminum Conductor.**
****Tinned cable bolt (included in the kit), each end with a different diameter.**
*****Check other available diameters**

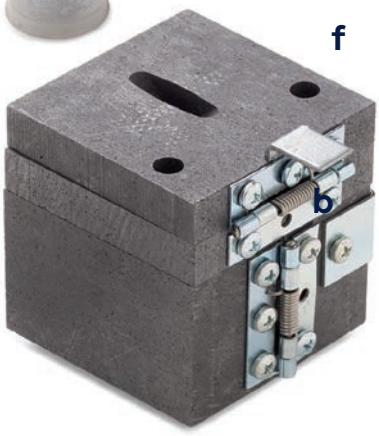
KITS´ inDuo[AL] PARTS

The **Kit inDuo[AI] Kit by LK-weld** includes:

a. Sand/graphite mold.

b. Aluminothermic powder cartridge and ignition powder for welding.

c. Dosage of filler powder.



The necessary accessories to perform the welding procedure are:

e. **Funnel**. There are different sizes depending on the kit: Funnel **60**, Funnel **80**, Funnel **100**..

f. **Hopper** with lid.There are different sizes depending on the kit: Hopper **60**, Hopper **80**, Hopper **100**...

g. Clamp.

h. Hammer.

i. Cold-cutting too.

j. Brush.

k. Scraper brush

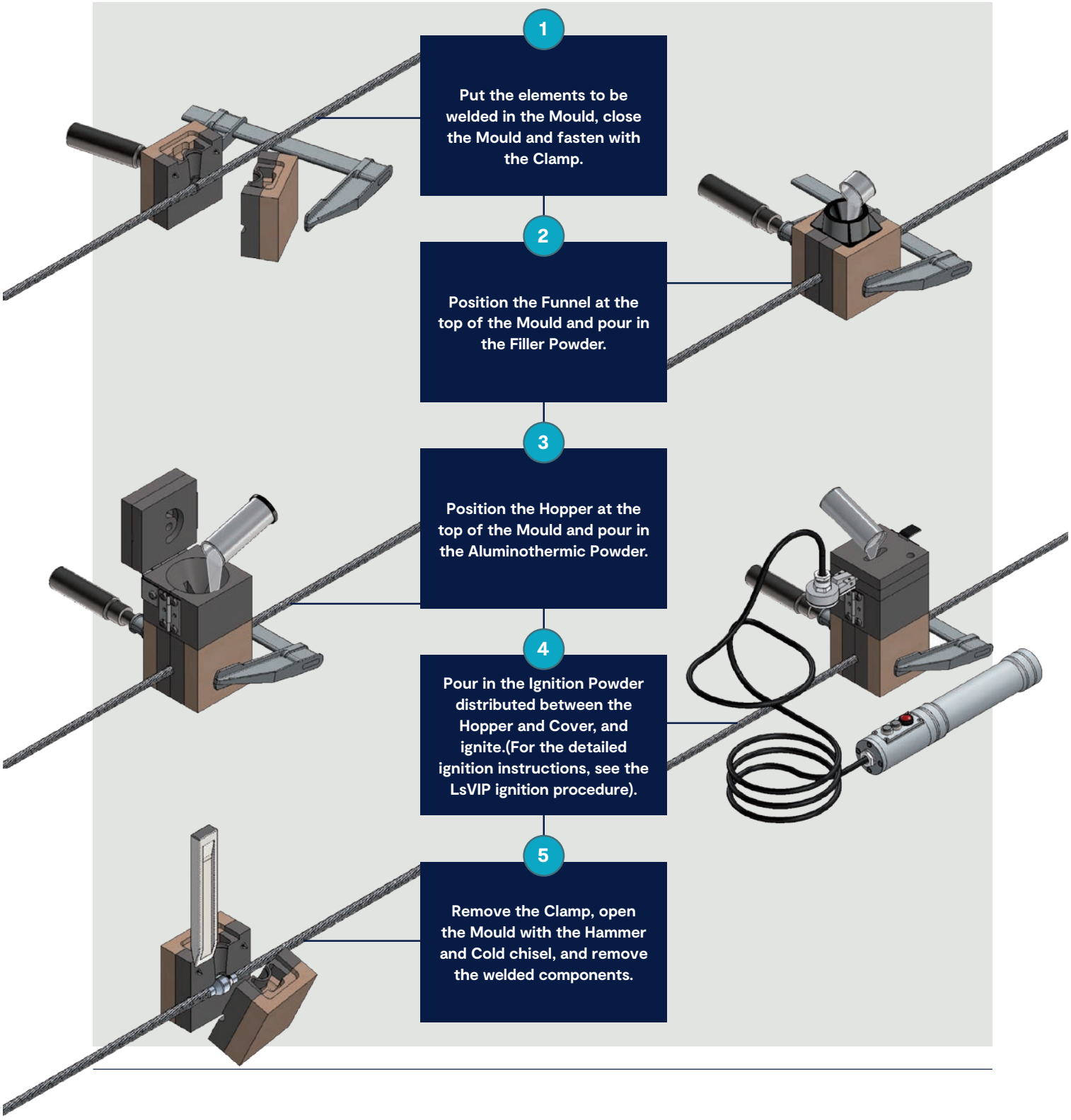
Ignition Procedure, atwo ways to start the reaction.

Remote ignition device, LsVIP.

Flint igniter.

Fuses.

Ease and speed of execution.



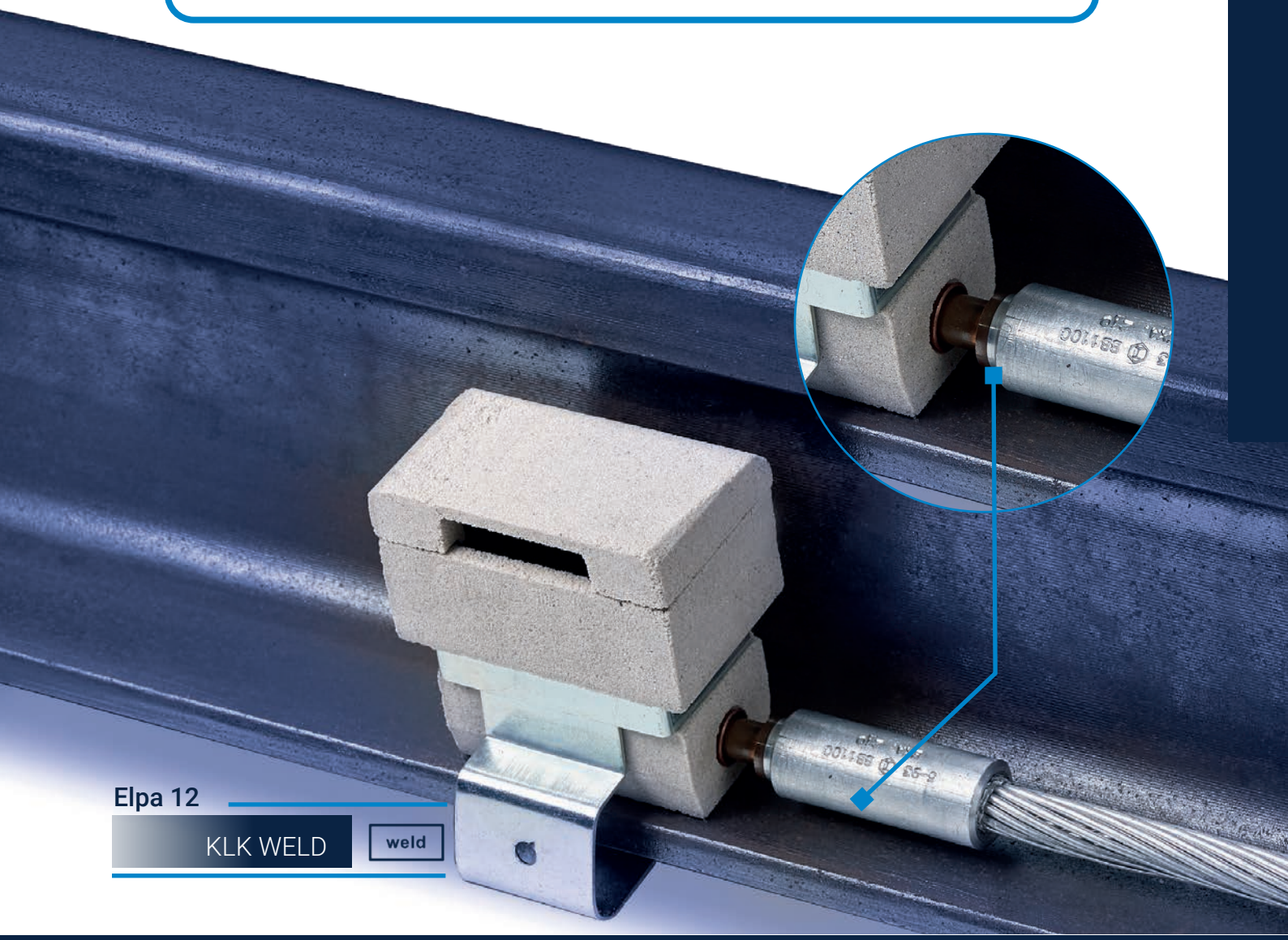
1. Put the elements to be welded in the Mould, close the Mould and fasten with the Clamp.
2. Position the Funnel at the top of the Mould and pour in the Filler Powder.
3. Position the Hopper at the top of the Mould and pour in the Aluminothermic Powder.
4. Pour in the Ignition Powder distributed between the Hopper and Cover, and ignite.(For the detailed ignition instructions, see the LsVIP ignition procedure).
5. Remove the Clamp, open the Mould with the Hammer and Cold chisel, and remove the welded components.

ELPA 12 WELDING PROCEDURE ELPA 12

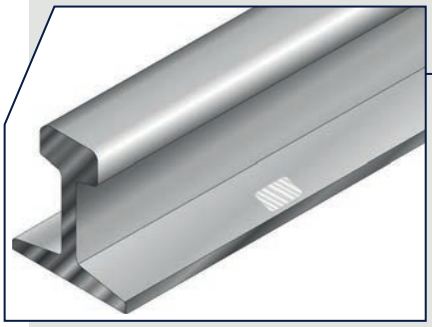
ELPA 12 welding procedure is used for the electrical connection of aluminum cable to the rail pad. A bimetallic aluminum-copper terminal is employed for this purpose, and the bonding of both metals is achieved through a friction welding process. The **interior of the aluminum body contains neutral grease to prevent oxidation.**

The copper bolt of the bimetallic terminal is welded to the ELPA 12, so on-site, it is only necessary to bring the aluminum cable to the end and perform t**he ELPA 12 welding onto the rail** pad using the usual procedure.

Tip Top:
Do you know the 'why' of Elpa 12? The number 12 corresponds to the measurement value of the bolt, with its diameter being 12 mm.

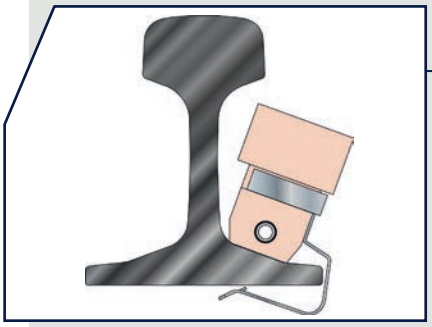


EASE AND SPEED OF EXECUTION

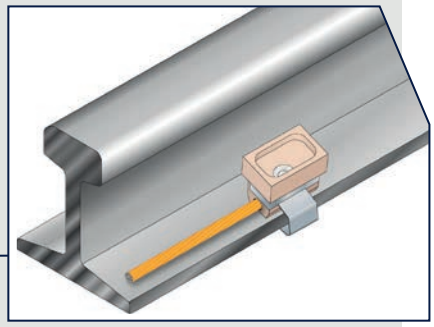


1 Clean and grind the rail surface.

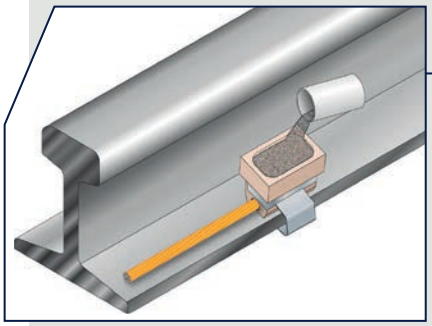
2 Apply the fluxportion to the prepared area.



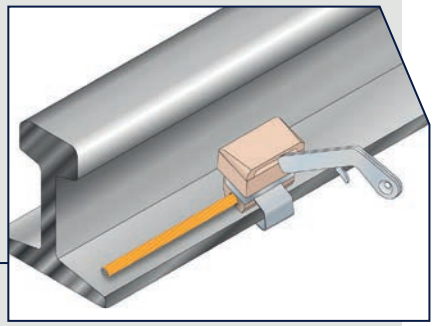
3 Put the mould in place.



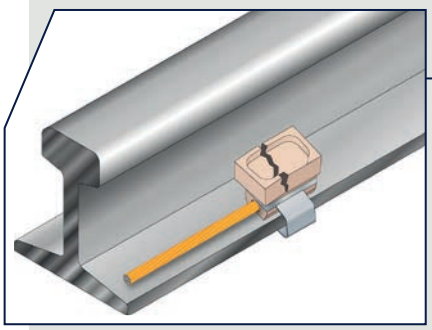
4 Insert the cable into the mould.



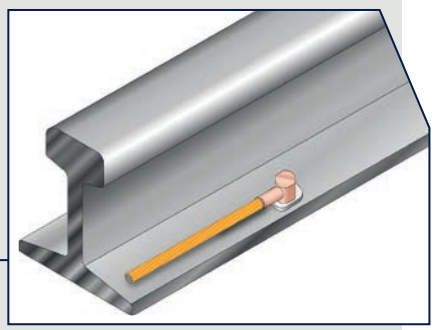
5 Pour the weldind powder.



6 Perform the ignition.



7 Wait for solification, break the mould and clean.



8 Finished weld.

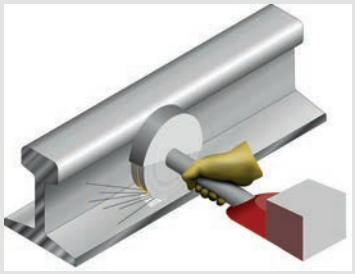
IGNITION PROCEDURE LSVIP TO THE RAIL WITH CRA-TP

The LsVIP KLK Weld ignition procedure is the best ignition procedure from the standpoint of safety and cleanliness.

- Completely close the crucible hopper of the mold, preventing the external release of projections resulting from the aluminothermic reaction.
- Reduces smoke emissions.
- It is suitable for use with both the ignition gun and the remote ignition device.
- Allows ignition to take place at a certain distance from the mold.

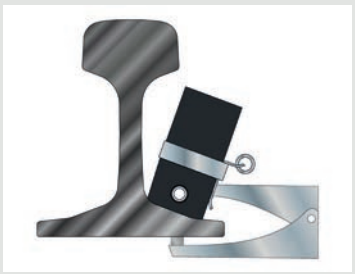
PROCEDURE KLK WELD TO THE RAIL CRA-TP

1.Remove the insulation from the cable about 15 cm. Clean the surface to be welded with a wire brush to eliminate oxides and impurities.

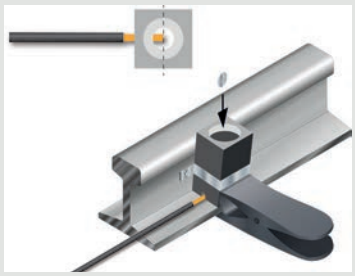


2. Grind the area to be welded to completely remove rust. The cleaning operation must be carried out with special care as it influences the quality of the welding.

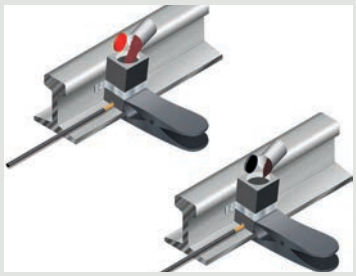
3. Before the first welding, preheat the mold for at least 5 minutes to remove moisture and prevent porosity in the weld.



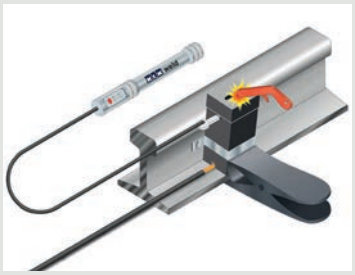
4. Close the clamp and lock it. Use sealing paste between the cable and the mold to prevent loss of molten metal.



5. Verify that the end of the cable is positioned in the middle of the pour hole. Place the metal disk at the bottom of the hopper with the tapered part facing downward.

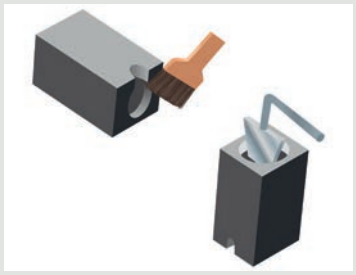


6. Open the colored cartridge lid and pour the welding powder into the mold hopper.



7. Close the mold lid. Place the ignition gun or remote ignition device laterally on the ignition powder and activate them to achieve ignition.

8.Wait for one minute before opening the mold clamp. Open it completely to extract the welding. During this operation, special care should be taken not to damage the mold.



9. Remove the slag from the hopper, the pour hole, and the mold lid with a mold scraper. Clean any remaining dirt from the welding chamber with a brush.

www.klk.es

KLK Weld by KLK Electro Materials

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