

## Earthing technology for traffic sector



**Product overview**

# Our products from the division BUILDING SOLUTIONS

## SERVICES

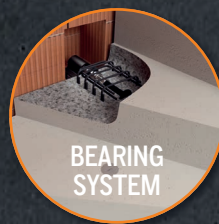
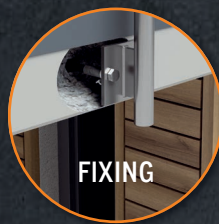
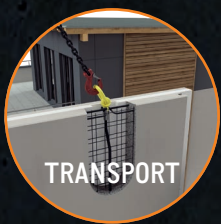
- » On-site tests -> we ensure that your requirements are properly covered by our planning.
- » Test reports -> for your safety and documentation.
- » Trainings -> the knowledge of your employees from planning and production is enhanced by our experts on site, online or via webinar.
- » Planning support -> latest design software, planning documents, CAD data and much more can be downloaded any time from [www.philipp-group.de](http://www.philipp-group.de).

## HIGH DEMANDS ON PRODUCT SAFETY AND PRACTICALITY

- » Close cooperation with notified bodies and - if necessary - approval of our solutions.

## TECHNICAL DEPARTMENT

- » Our expert-team will support you at any time during your planning phase with detailed advice.



## CONTENT

<b>PRODUCT GROUPS</b>	Page	4
<b>EARTHING SLEEVE</b>	Page	5
<b>TYPE OVERVIEW - EARTHING SLEEVES</b>	Page	6
Type 71 EB F40	Page	7
Type 71 EB B16	Page	8
Type 71 EB K95	Page	9
<b>EARTHING CONNECTOR</b>	Page	10
<b>TYPE OVERVIEW - EARTHING CONNECTORS</b>	Page	11
Type 71 EV K50	Page	12
Type 71 EV K70	Page	13
<b>SPECIAL PARTS / PROTECTION LABEL</b>	Page	14
<b>FIXING ACCESSORIES</b>	Page	15
<b>CERTIFIED AND APPROVED DRAWINGS</b>	Page	16



# PHILIPP Earthing technology for traffic sector

## PRODUCT GROUPS

The Earthing sleeves and connectors are earthing technology products for the traffic sector. These can be used for return current management, traction system earthing and potential equalisation.

In the area of railway traffic, the requirements of the respective responsible operator apply. Therefore, the relevant drawings of the rail operators (e.g. Deutsche Bahn DB, Österreichische Bundesbahn ÖBB) shall be observed (for a list, see page 6 and 11).

## PRODUCT GROUPS

EARTHING SLEEVE	EARTHING CONNECTOR
	
<p>Earthing sleeves are the products that are installed directly in the concrete element. These can be used to provide a connection point for external conductors. It is also possible to have complete internal connections as well as cable runs with a sleeve at each end.</p>	<p>Products used for external connections are named as Earthing connectors.</p>



### NOTE THE INFORMATION AND REGULATIONS!

For every planning, installation (Earthing sleeve) and mounting (Earthing connector) of PHILIPP Earthing technology, the product-specific information and instructions as well as the applicable regulations of the railway operator must be followed!



## EARTHING SLEEVE

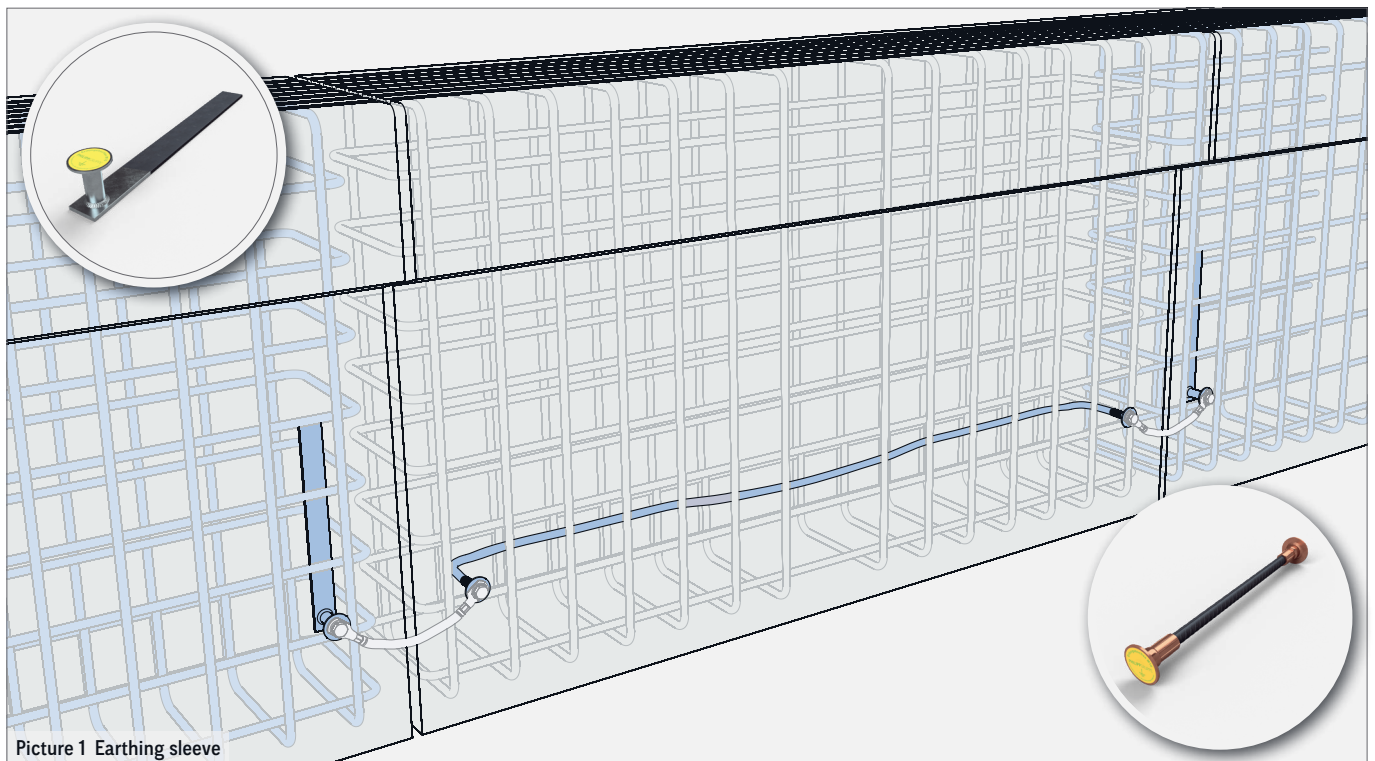
In order to be able to integrate the Earthing sleeve as flexibly as possible into the existing planning of a concrete member PHILIPP offers different types and designs of Earthing sleeves.

If a tight connection between the Earthing sleeve and the existing member reinforcement is possible, the versions 71 EB F40.01 and 71 EB B16.01 can be used. To bypass existing reinforcement the bent versions 71 EB F40.03 and 71 EB B16.03 can be used for example. With the 71 EB F40.02 and 71 EB B16.02 versions, a stiff, continuous connection through a concrete element with two external connection points is created. If a flexible connection between the Earthing sleeve and reinforcement is required, type 71 EB K95.01 can be taken.

For the electroconductive connection of two unconnected reinforcement areas within a concrete element type 71 EB K95.03 is available.

Type 71 EB K95.02 consists of two Earthing sleeves connected with a flexible conductor.

In combination with the existing reinforcement the Earthing sleeves must be connected electroconductively by welding in accordance with the drawings on pages 16, 18 and 19. Welding shall only be done by a qualified specialist. All mentioned Earthing sleeves are approved by Deutsche Bahn AG, Germany (DB). The type 71 EB F40.01 is also approved by the Österreichische Bundesbahn (ÖBB).



## TYPE OVERVIEW - EARTHING SLEEVES

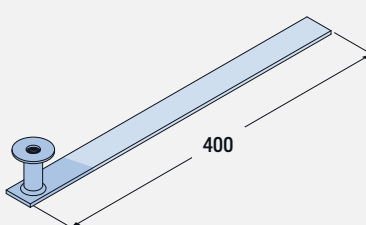
TABLE 1: TYPE OVERVIEW EARTHING SLEEVES

Type	Version	Product	Draw. no. DB*	Draw. no. ÖBB**
71 EB Earthing sleeve	F40 Flat steel 40 mm × 5 mm (page 7)	01 Earthing sleeve straight flat steel	3 Ebs 15.03.19-11 (see page 16)	ED 6409 Bl.5 (see page 17)
		02 double-sided Earthing sleeve straight flat steel		
		03 Earthing sleeve 90° angled flat steel		
	B16 Reinforcing steel Ø16 mm (page 8)	01 Earthing sleeve straight rebar	3 Ebs 15.03.19-25 (see page 18)	-
		02 double-sided Earthing sleeve straight rebar		
		03 Earthing sleeve 90° angled rebar		
	K95 Cooper cable 95 mm <sup>2</sup> (page 9)	01 Earthing sleeve welding strap	3 Ebs 15.03.19-26 (see page 19)	-
		02 double-sided Earthing sleeve		
		03 double sided welding strap		

\* DB = Deutsche Bahn AG; \*\*ÖBB = Österreichische Bundesbahn

**71 EB F40 . 01 - 0400**

- Nominal length: **0400** = 400 mm
- Version: **01** = one-sided Earthing sleeve, straight flat steel
- Conductor: **FL40** = flat steel 40 × 5
- Product: **EB** = Earthing sleeve
- Product group: **71** = Earthing technique



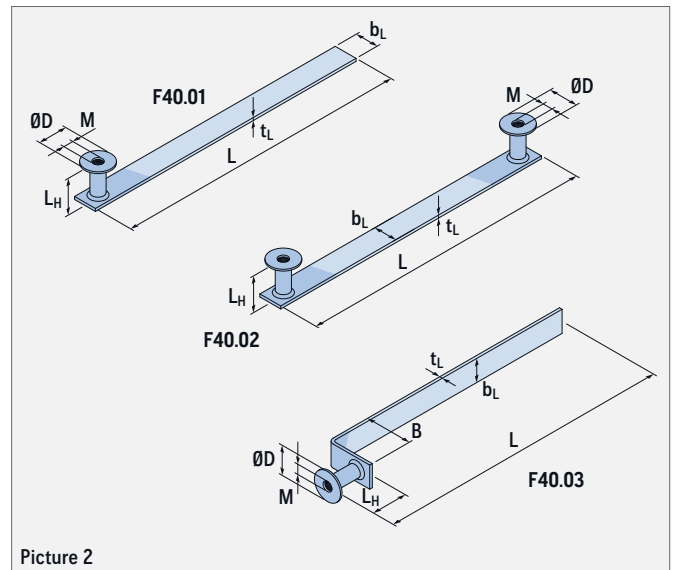
**Classification Earthing sleeves**

## EARTHING SLEEVE

### EARTHING SLEEVE TYPE 71 EB F40

The Earthing sleeve type 71 EB F40 is made of a flat steel with welded-on insert and a stainless washer. In order to protect the end area of the Earthing sleeve against corrosion it is galvanized. All types of Earthing sleeves with a thread are covered with a protective sticker, which shall only be removed when installing the Earthing connectors.

The standard length of the flat steel is  $L=400$  mm, it can be customized on request. Basically the length has to be determined in a way that a welding of the Earthing sleeve with the reinforcement is possible and follows the instructions mentioned in the approved drawings (page 16).



Picture 2

TABLE 2: DIMENSIONS OF THE EARTHING SLEEVE TYPE 71 EB F40

Type	M	Conductor cross section (mm <sup>2</sup> )	b <sub>L</sub> (mm)	t <sub>L</sub> (mm)	L (mm)	B (mm)	ØD (mm)	L <sub>H</sub> (mm)
71 EB F40.01-0400	M16	200	40	5	400 (standard)	-	50	53
71 EB F40.02-0400	M16	200	40	5	400 (standard)	-	50	53
71 EB F40.03-0350	M16	200	40	5	350 (standard)	110	50	53

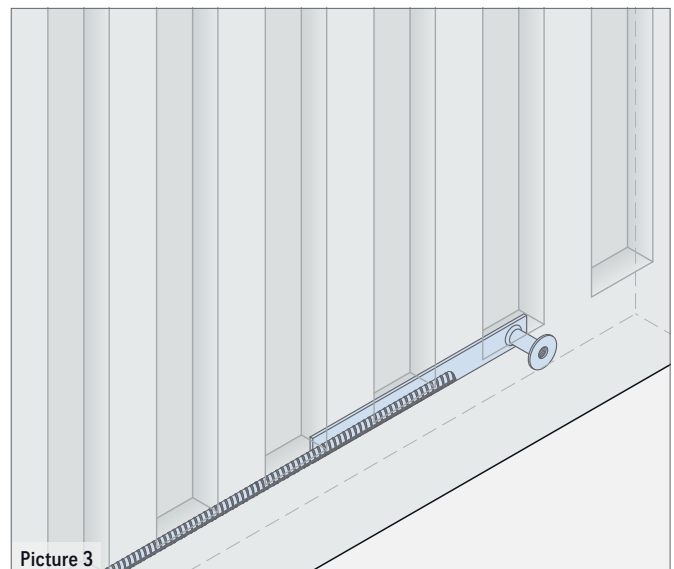
Other versions and lengths available on request.

### FASTENING

- » Bolted connection M16 (see page 16)
- » Welded connection

### APPROVALS

- » Deutsche Bahn AG (see page 16)
- » Österreichische Bundesbahn (type 71 EB F40.01, see page 17).



Picture 3



### PROTECTIVE STICKER

The protective sticker shall only be removed for the installation of the Earthing connectors.

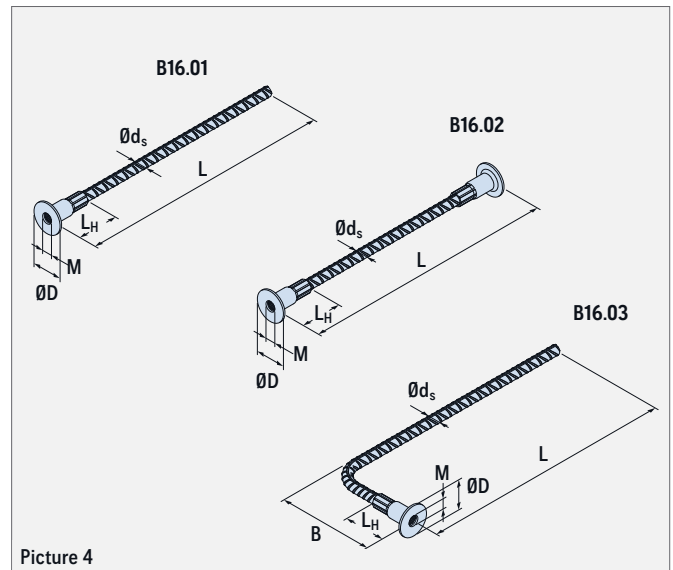
If the sticker is damaged beforehand, it must be replaced immediately or the thread must be protected against moisture and dirt using a screw with a washer (tightening torque approx. 80 Nm).

## EARTHING SLEEVE

### TYP 71 EB B16

In contrast to the Earthing sleeve with flat steel, the type 71 EB B16 has a  $\varnothing 16$  reinforcing steel as a conductor. In this version, the insert is crimped directly on the rebar. The insert also consists of a steel sleeve with a welded-on stainless steel washer. With the type 71 EB 16, the insert is provided with a copper layer, which, in addition to its good conductivity, also functions as additional corrosion protection. The thread is closed with a protective sticker to prevent dirt and corrosion until the actual installation.

The overall length is  $L = 400$  mm, it can be customized on request.



Picture 4

TABLE 3: DIMENSIONS OF THE EARTHING SLEEVE TYPE 71 EB B16

Type	M	Conductor cross section (mm <sup>2</sup> )	Ø <sub>ds</sub> (mm)	L (mm)	B (mm)	Ø <sub>D</sub> (mm)	L <sub>H</sub> (mm)
71 EB-B16.01-0400	M16	201	16	400 (standard)	-	50	53
71 EB B16.02-0400	M16	201	16	400 (standard)	-	50	53
71 EB B16.03-0400	M16	201	16	400 (standard)	min. L <sub>H</sub> + 70	50	53

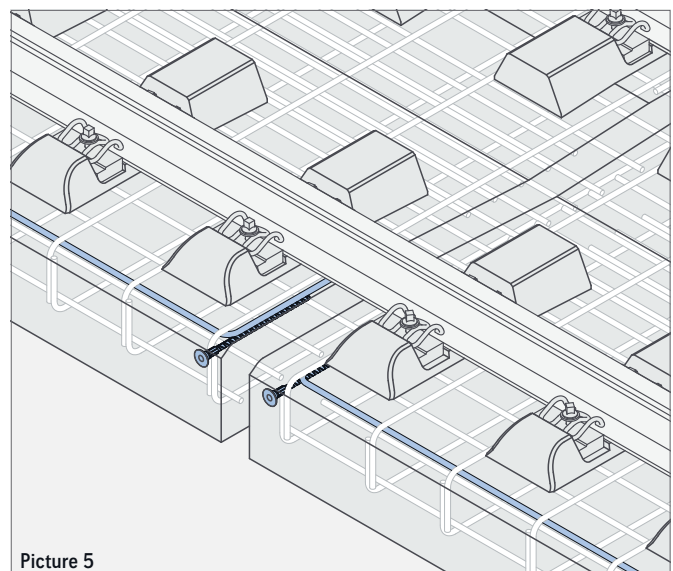
Other versions and lengths available on request.

### FASTENING

- » Bolted connection M16 (see page 18)
- » Welded connection

### APPROVALS

- » Deutsche Bahn AG (see page 18)



Picture 5



### PROTECTIVE STICKER

The protective sticker shall only be removed for the installation of the Earthing connectors. If the sticker is damaged beforehand, it must be replaced immediately or the thread must be protected against moisture and dirt using a screw with a washer (tightening torque approx. 80 Nm).

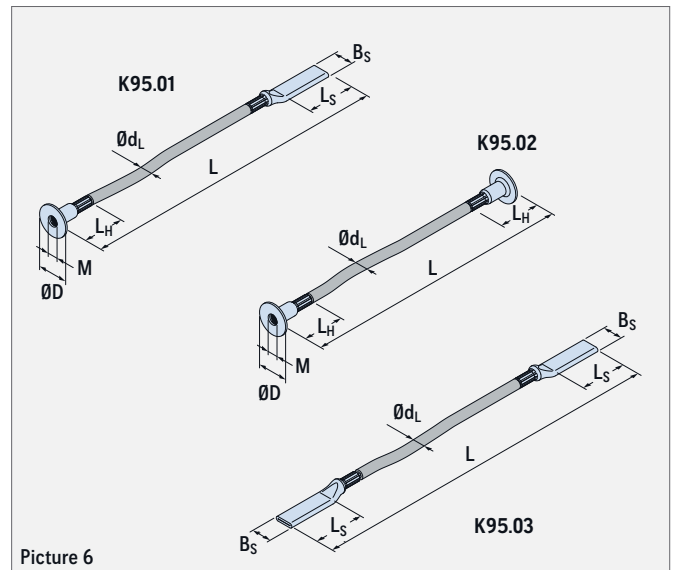


## EARTHING SLEEVE

### TYP 71 EB K95

The Earthing sleeve 71 EB K95 has a flexible copper cable with a cross section of 95 mm<sup>2</sup> as a conductor. It is available with a crimped-on insert as well as welding strap for attaching to the reinforcement. The welding strap is made by pressing a special steel tube. Both the insert as well as the welding strap are coated with a copper layer to increase the conductivity and protect against corrosion. The thread is protected from dirt by a protective sticker until the final installation on job site.

As a standard length  $L = 400$  mm is defined, it can be changed on request.



Picture 6

TABLE 4: DIMENSIONS OF THE EARTHING SLEEVE TYPE 71 EB K95

Type	M	Conductor cross section (mm <sup>2</sup> )	Ød <sub>L</sub> (mm)	L (mm)	ØD (mm)	L <sub>H</sub> (mm)	B <sub>S</sub> (mm)	L <sub>S</sub> (mm)
71 EB K95.01-0400	M16	95	19.2	400 (standard)	50	53	30	80
71 EB K95.02-0400	M16	95	19.2	400 (standard)	50	53	-	-
71 EB K95.03-0400	-	95	19.2	400 (standard)	-	-	30	80

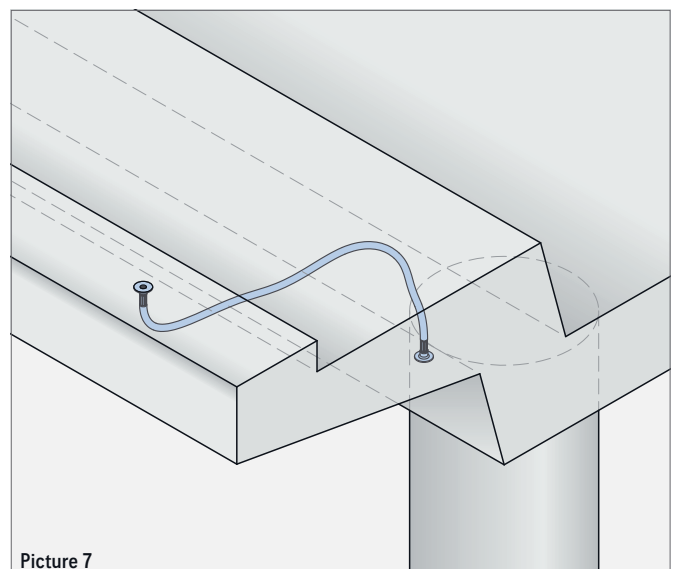
Other versions and lengths available on request.

### FASTENING

- » Bolted connection M16 (see page 19)
- » Welded connection

### APPROVALS

- » Deutsche Bahn AG (see page 19)



Picture 7



### PROTECTIVE STICKER

The protective sticker shall only be removed for the installation of the Earthing connectors. If the sticker is damaged beforehand, it must be replaced immediately or the thread must be protected against moisture and dirt using a screw with a washer (tightening torque approx. 80 Nm).

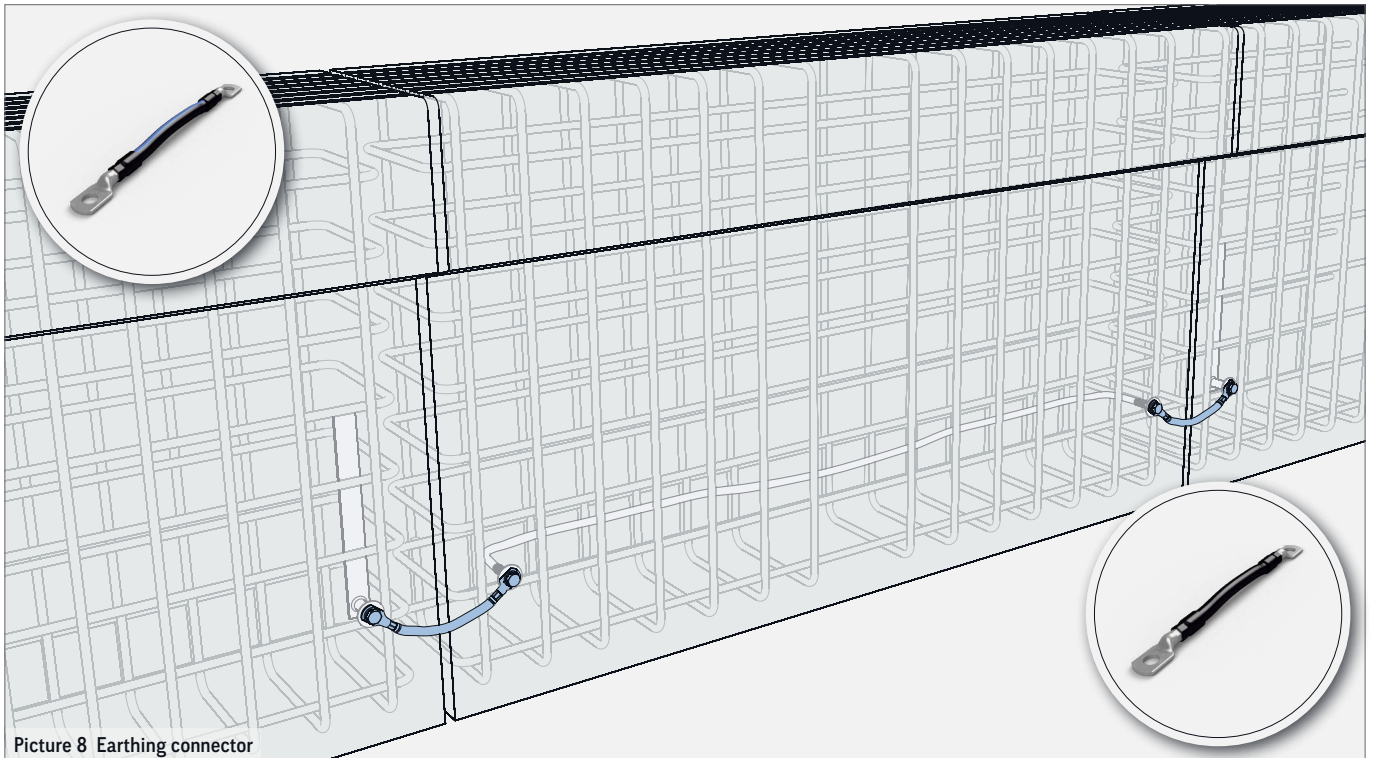
## EARTHING CONNECTOR

Earthing connectors are used for the external earthing connection of concrete elements within railway systems (e.g. platform plinths).

The ends of the conductor are crimped with cable lugs in accordance with standards and are fastened to the Earthing sleeves using bolted connections.

All connectors differ fundamentally in terms of the cable types used and the conductive cross sections.






Depending on the application, select the appropriate type of Earthing connector or refer to the building specifications.



Picture 8 Earthing connector

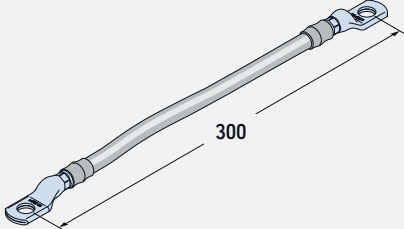
## TYPE OVERVIEW - EARTHING CONNECTOR

TABLE 5: TYPE OVERVIEW EARTHING CONNECTOR

Type		Version	Product	Draw. no. DB (Deutsche Bahn AG)
71 EV Earthing connectors	K50 Cooper cable 50 mm <sup>2</sup> (page 12)	01 PVC cable coating double-sided cable lug		3 Ebs 15.3.17-1
		02 Halogen-free cable coating double-sided cable lug		3 Ebs 15.3.17-1
	K70 Cooper cable 70 mm <sup>2</sup> (page 13)	01 PVC cable coating double-sided cable lug		3 Ebs 15.3.17-1
		02 Halogen-free cable coating double-sided cable lug		3 Ebs 15.3.17-1
	K70 CuStAl cable 70 mm <sup>2</sup> (page 13)	03 VPE cable coating double-sided cable lug		3 Ebs 15.3.17-6

**71 EV K70 . 03 - 0300**

- Nominal length: **0300** = 300 mm
- Version: **03** = VPE cable coating, double-sided cable lug
- Conductor: **K70** = CuStAl cable 70 mm<sup>2</sup>
- Product: **EV** = Earthing connector
- Product group: **71** = Earthing technique



Classification Earthing connectors

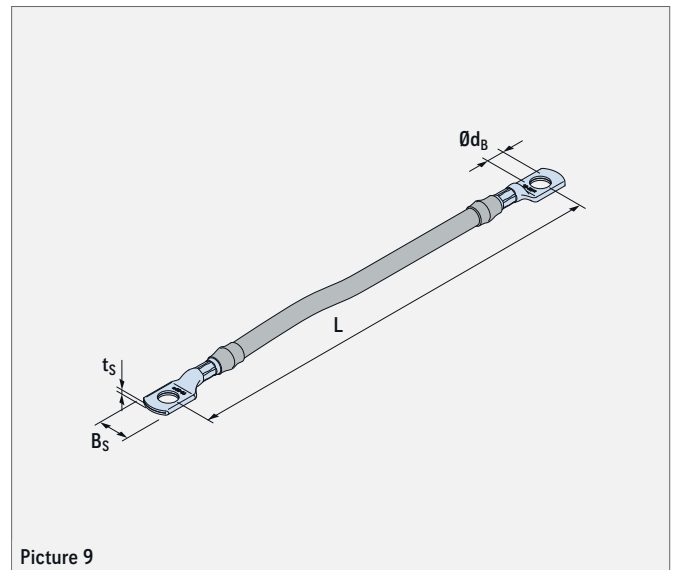
## EARTHING CONNECTORS

### TYPE 71 EV K50

The Earthing connector type 71 EV K50.01 consists of a copper cable NYY-0 as a conductor and two galvanically tinned compression cable lugs according to DIN 46235 as end finish. Type 71 EV K50.02 of the conductors consists of a copper cable N2XH-0 with a halogen-free cable coating. Both connection types comply with the Ebs 15.03.17-1 specifications of Deutsche Bahn AG.

The standard hole centre distance of the Earthing connectors is  $L = 300$  mm and can be varied according to customer requirements. The holes in the cable lugs are designed to have a fastening with stainless steel screws of size M16.

An additional corrosion protection, a shrunk-on protective hose at the connection between cable and cable lug, is possible on request.



Picture 9

TABLE 6: DIMENSIONS OF THE EARTHING CONNECTORS 71 EV K50

Type	$\text{Ø}d_B$ (mm)	Conductor cross section (mm <sup>2</sup> )	L ① (mm)	$B_s$ (mm)	$t_s$ (mm)
71 EV K50.01-0300	Ø17	50	300 (standard)	30	4.5
71 EV K50.02-0300	Ø17	50	300 (standard)	30	4.5

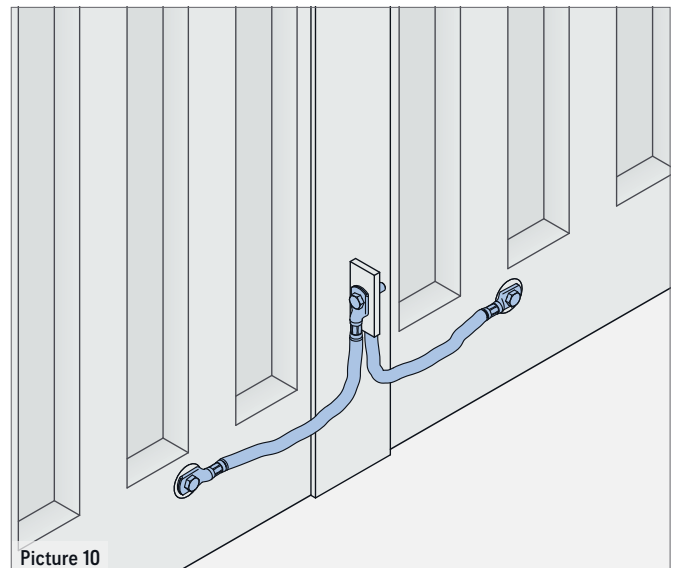
① Other dimensions available on request.

### FASTENING

» Bolted connection M16 (acc. to railway specifications)

### APPROVALS

» Deutsche Bahn AG (see page 11)



Picture 10

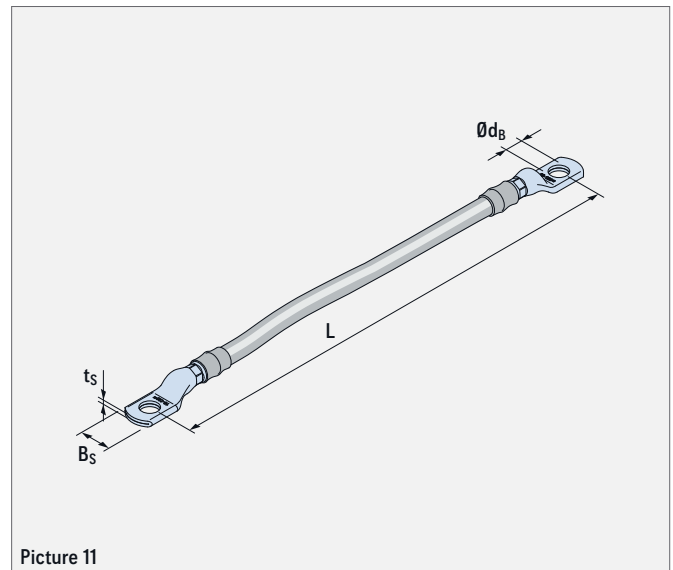
## EARTHING CONNECTOR

### TYPE 71 EV K70

The Earthing connectors type 71 EV K70.01 and 71 EV K70.012 consists of a copper cable NYY-0 resp. N2XH-0 as a conductor and two galvanized tin-plated compression cable lugs according to DIN 46235 as end finish. A shrunk-on protective hose is optionally available to protect the connection between cable and cable lug from corrosion.

For the Earthing connector type 71 EV K70.03 a BayEnergy® power cable of the company Bayrische Kabelwerke AG is used. The connection points are protected with a protective hose as standard.

The standard hole centre distance is  $L = 300$  mm and can be varied according to customer requirements. All cable lugs have clearance holes for stainless steel screws with M16 thread.



Picture 11

TABLE 6: DIMENSIONS OF THE EARTHING CONNECTORS 71 EV K50

Type	$\text{Ø}d_B$ (mm)	Conductor cross section (mm <sup>2</sup> )	L ① (mm)	$B_S$ (mm)	$t_S$ (mm)
71 EV K70.01-0300	Ø17	70	300 (standard)	32	5.0
71 EV K70.02-0300	Ø17	70	300 (standard)	32	5.0
71 EV K70.03-0300	Ø17	70	300 (standard)	32	5.0

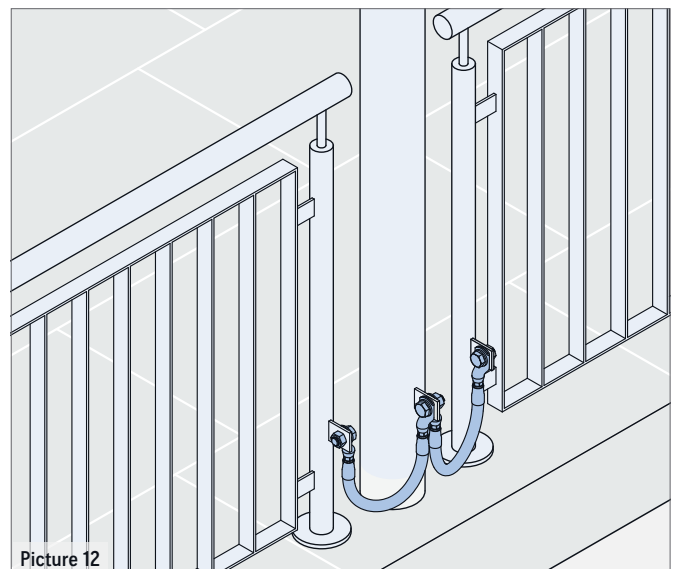
① Other dimensions available on request.

### FASTENING

» Bolted connection M16 (acc. to railway specifications)

### APPROVALS

» Deutsche Bahn AG (see page 11)

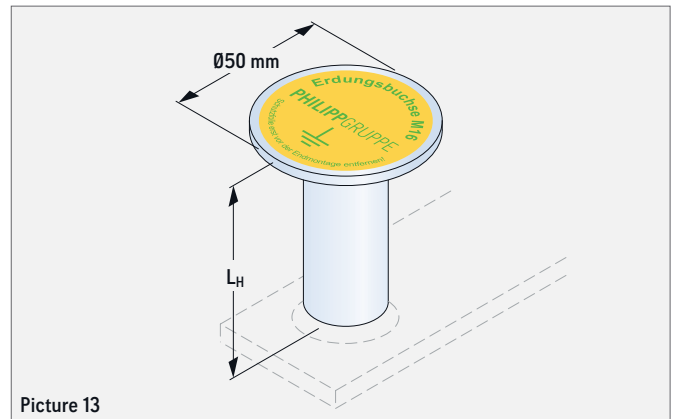


Picture 12

## SPECIAL PARTS / PROTECTIVE STICKER

### SLEEVE FOR WELDING TO FLAT STEEL

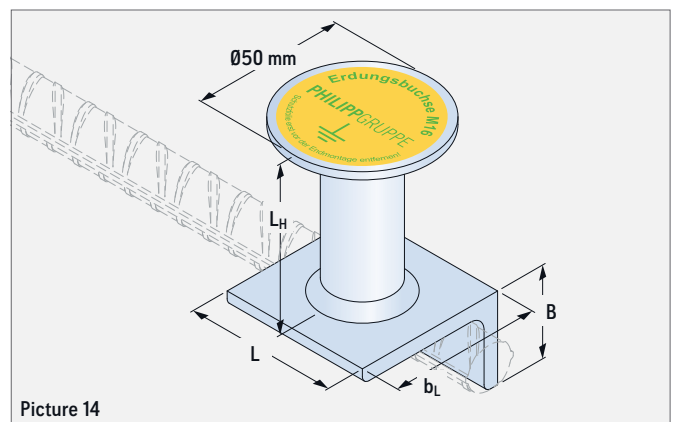
The Sleeve is used for on-site welding to flat steel.  
The use of PHILIPP Earthing sleeve shall be technically coordinated and is only possible where an approval of Deutsche Bahn AG or Österreichische Bundesbahn is not required.



Picture 13

### SLEEVE WITH WELDING PLATE FOR REINFORCING STEEL

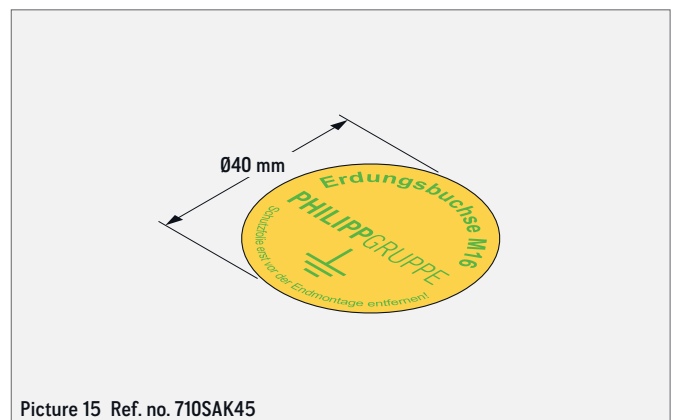
This sleeve with welding plate is used for on-site welding to reinforcing steel or round steel.  
It must be ensured that only a connection to conductors with a minimum cross section of  $200 \text{ mm}^2$  is made.  
The use of PHILIPP Earthing sleeve shall be technically coordinated and is only possible where an approval of Deutsche Bahn AG or Österreichische Bundesbahn is not required.



Picture 14

### PROTECTIVE STICKER

The protective sticker protects the Earthing sleeve from moisture and dirt.



Picture 15 Ref. no. 710SAK45

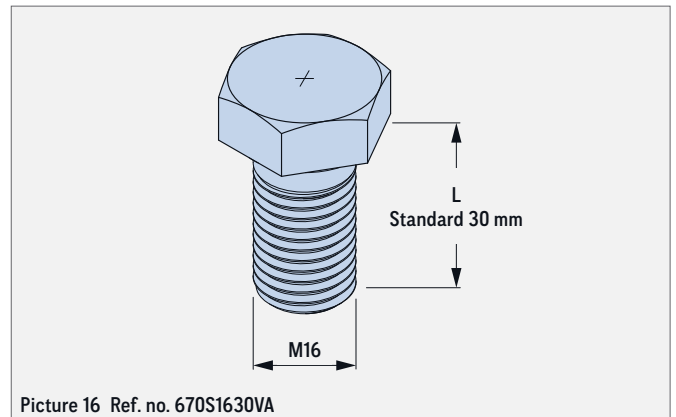
### PROTECTIVE STICKER

The protective sticker shall only be removed for the installation of the Earthing connectors.  
If the sticker is damaged beforehand, it must be replaced immediately or the thread must be protected against moisture and dirt using a screw with a washer (tightening torque approx. 80 Nm).

## FASTENING ACCESSORIES

### FASTENING SCREW

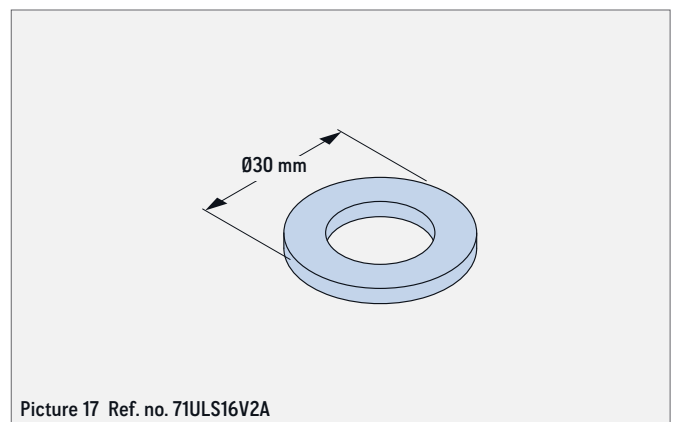
Screw ISO 4017-M16 – 16 × length L – A2  
Other lengths available on request.



Picture 16 Ref. no. 670S1630VA

### WASHER

Washer ISO 7089 – 16 – A2

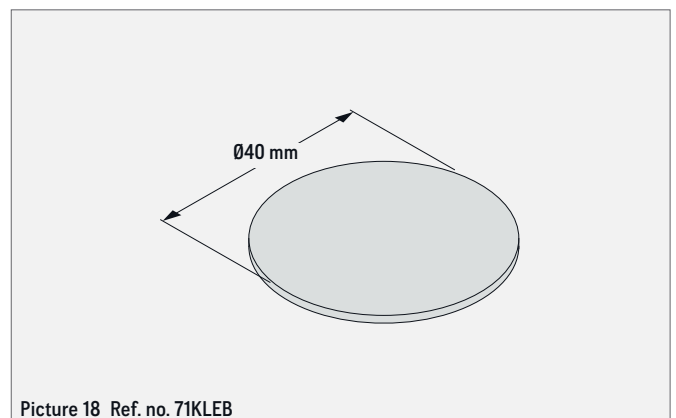


Picture 17 Ref. no. 71ULS16V2A

### STICKY PAD

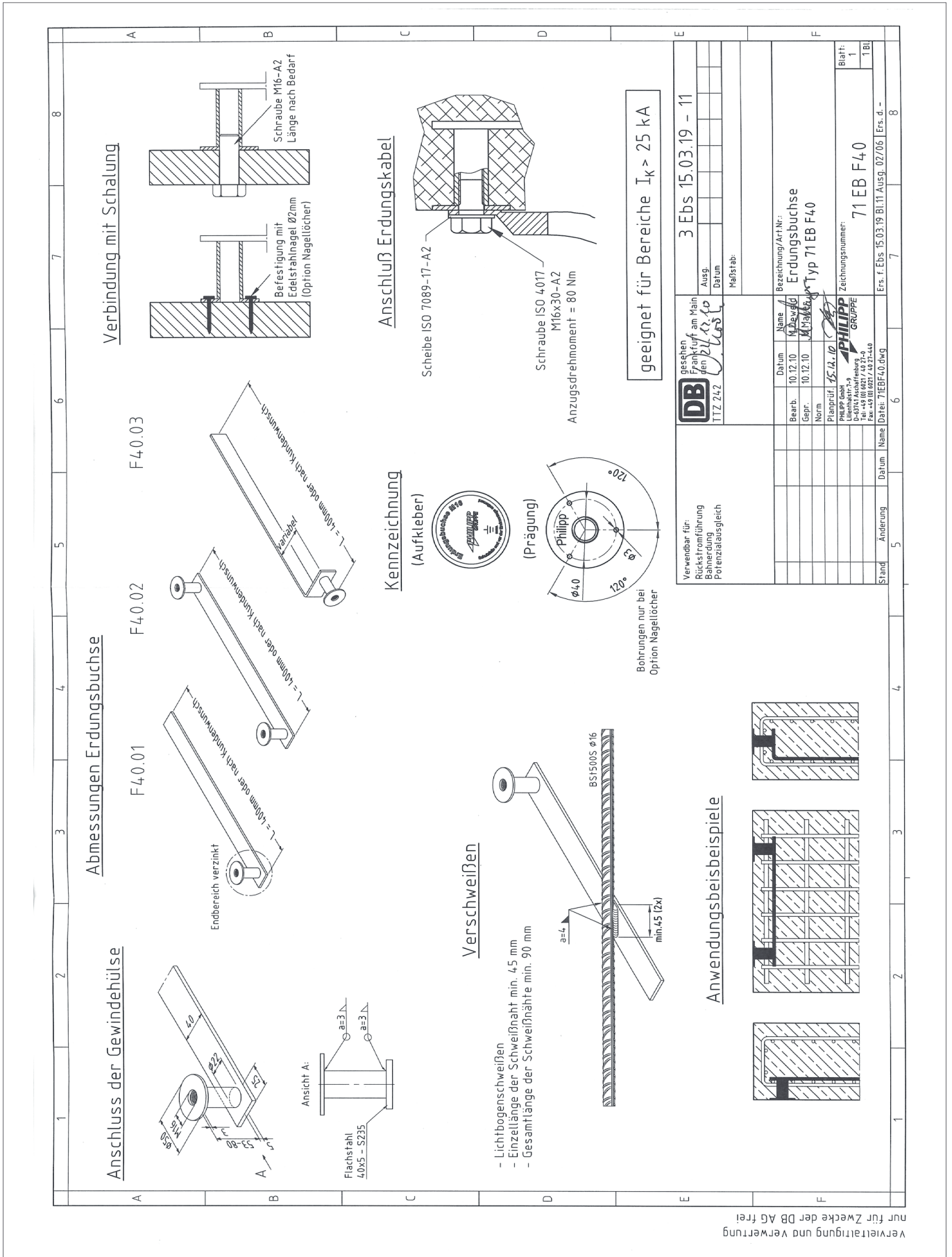
The double-sided sticky pad is used to attach the Earthing sleeve to steel formwork.

After demoulding, the protective sticker must be checked for readability as well as function and replaced if necessary.



Picture 18 Ref. no. 71KLEB

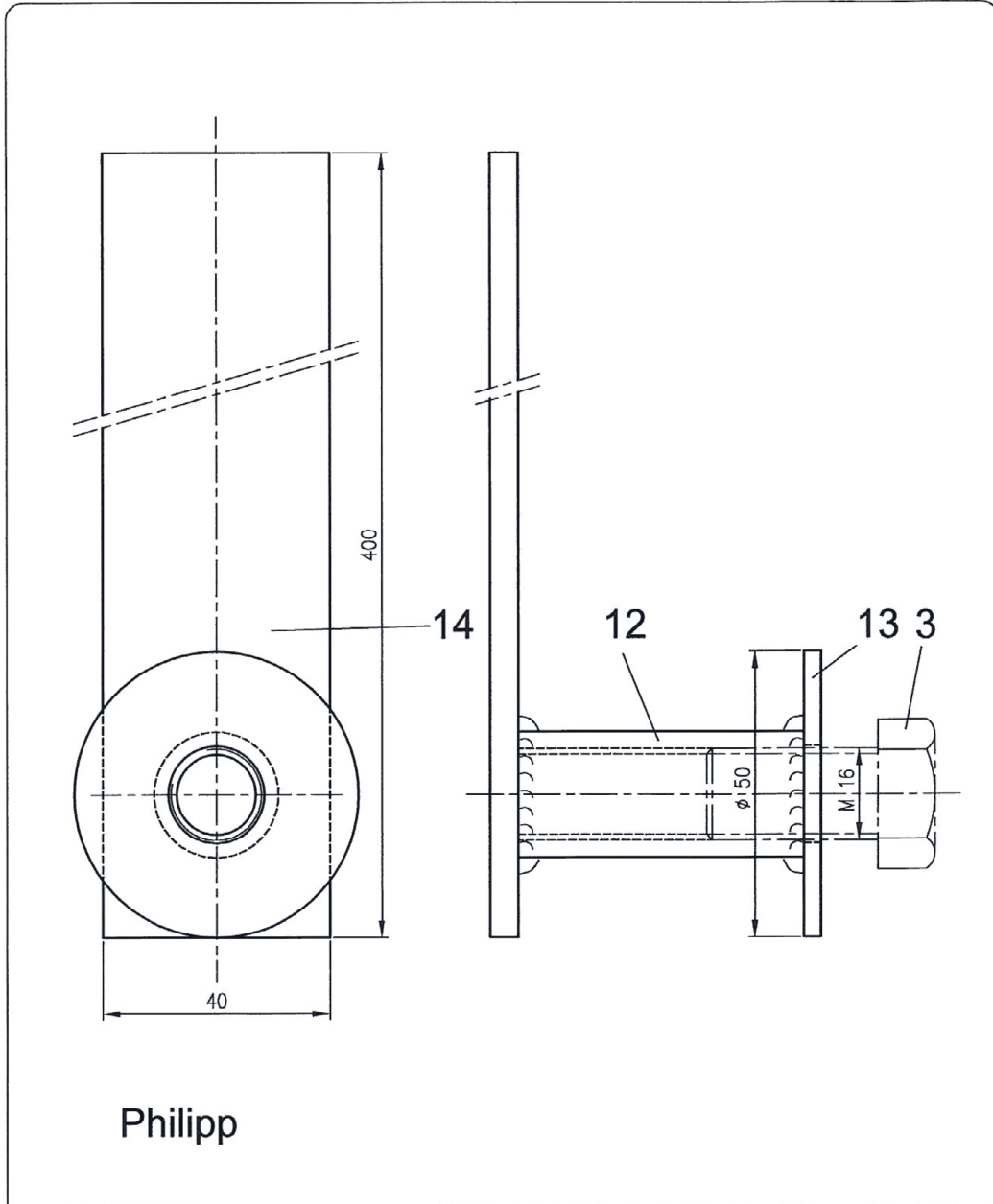
## APPROVAL DRAWING



Vertretung und Vernetzung nur für Zwecke der DB AG frei



APPROVAL DRAWING



x		Flachstahl FL 40x5	14	P.71ERD001.96	St 37	0.00	1	
x		Scheibe D 50x3	13	P.71ERD001.96	1.4301	0.00	1	
x		Hülse D 22x50	12	P.71ERD001.96	St 52-3	0.00	1	
x		Sechskantschraube M16x30	3	ON M 5010	4.6 tZn	0.00	1	
A	B	C	D	E	F	G	H	
Ausführung			Benennung	Teil	Zeichnung Norm	Werkstoff Anmerkung	Gewicht kg	Stk.

Änderung:

Dienststelle <b>EN</b>	Leiter <i>Gruha</i>	<b>Österreichische Bundesbahnen</b>
Planinhalt Erdanschluss für Stahlbetonbauwerke		Maßstab 1:1
Warennummer 464.09.		Plan-Nr. <b>ED 6409</b>
		Blatt <b>5</b>
Ausgabe/Datum 16.10.2000		
		gezeichnet Mann
		bearbeitet Kurzweil

## APPROVAL DRAWING

**Abmessungen Erdungsbuchsen**

B16.01  
B16.02  
B16.03

$L = 400\text{mm}$  oder nach Kundenwunsch  
 $L = 400\text{mm}$  oder nach Kundenwunsch  
 $L = 400\text{mm}$  oder nach Kundenwunsch

Ø50  
Ø16  
SC-1805  
M16  
a=4  
min. 45mm  
Gesamtlänge der Schweißnähte min. 90 mm

**Verbindungen mit Schalung**

Schraube M16-A2  
Länge nach Bedarf

Befestigung mit Edelstahlnagel Ø2mm  
(Option Nagelstücker)

**Kennzeichnung (Aufkleber)**

**(Prägung)**

Bohrungen nur bei Option Nagelstücker

**Anschluß Erdungskabel**

Scheibe ISO 7089-17-A2

Schraube ISO 4017  
M16x30-A2  
Anzugsdrehmoment = 80 Nm

**Verschweißen mit der Bewehrung**

BSF5005  
min. Ø16mm  
a=4

**Anwendungsbeispiele**

**Verwendbar für:**  
Rückstromführung  
Batterieführung  
Potentialausgleich

**DB** System  
geprüft am Main  
für 10 U  
TTZ 242

**3 Ebs 15.03.19 - 25**

Bezeichnung/Art.Nr.:  
Erdungsbuchse  
Typ 71 EB B16

Bezeichnung/Art.Nr.:  
Erdungsbuchse  
Typ 71 EB B16

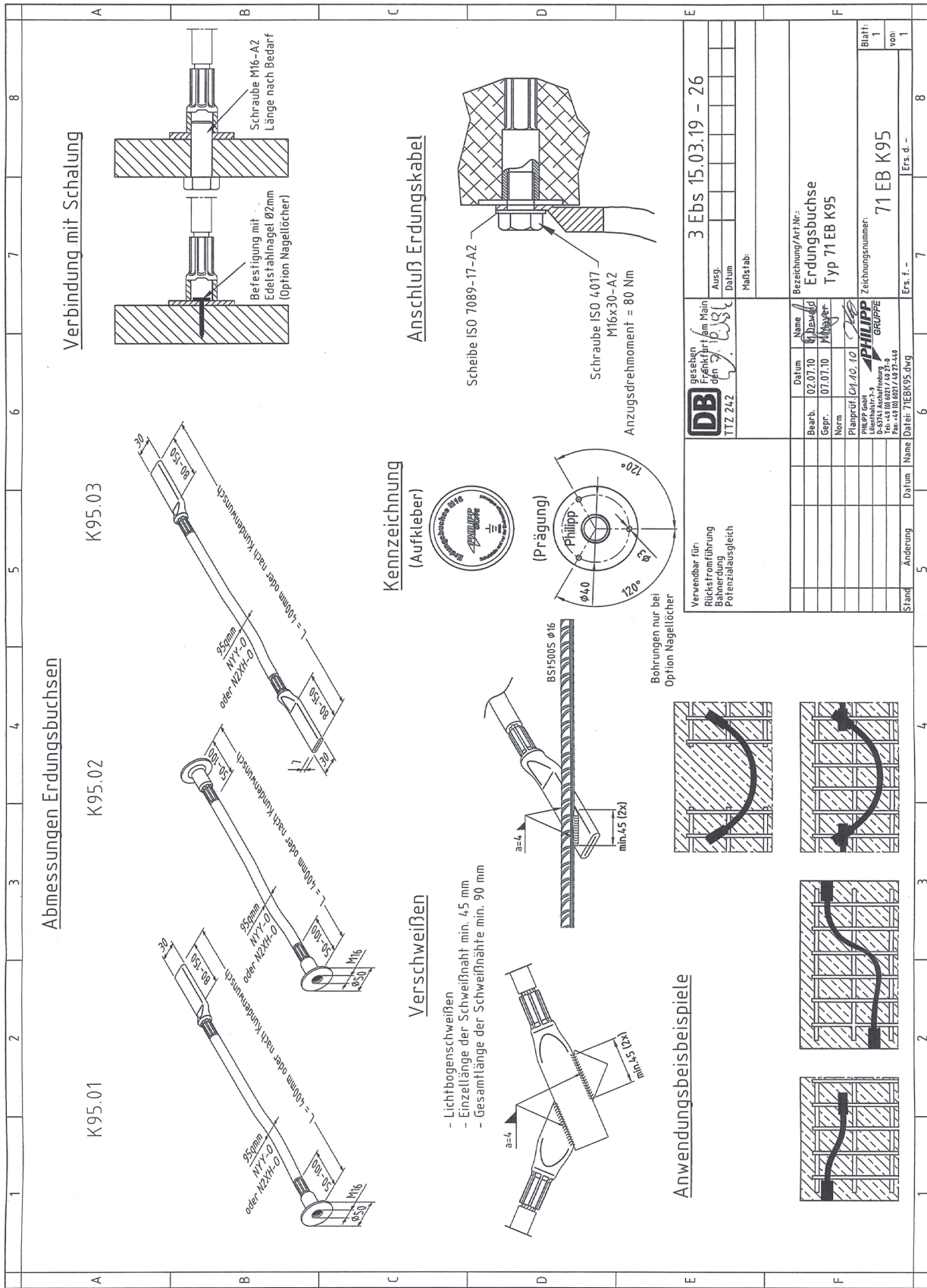
Zeichnungsnummer:  
71 EB B16

Stand: 1  
Änderung:  
Datum:  
Name:  
Datum:  
Name:

Stand: 1  
Änderung:  
Datum:  
Name:  
Datum:  
Name:

Ers. f. -  
Ers. d. -

nur für Zwecke der DB AG frei  
Verfälschung und Verwertung



<b>DB</b> gesehen geprüft TTTZ 242	Name M. Schneider	Datum 02.07.10	Bezeichnung/Art.Nr.: Erdungsbüchse Typ 71 EB K95
	Bearb. 07.07.10	Gepr. 07.07.10	Norm Philipp GmbH D-674 Ashaffenburg Tel. +49 930 927 43 27-410 Fax +49 930 927 43 27-410
Verwendbar für: Rückstromführung Bahnänderung Potenzialausgleich		Zeichnungsnummer: 71 EB K95	Blatt: von: 1 von: 1
Stand Änderung	Datum 02.07.10	Ers. f. - 7	Ers. d. - 8

3 Ebs 15.03.19 - 26

Masstab:

Maßstab:

Bezeichnung/Art.Nr.:

Erdungsbüchse

Typ 71 EB K95

Zeichnungsnummer:

71 EB K95

Blatt:

von: 1

von: 1

Ers. f. -

Ers. d. -

## HEADQUARTERS

Lilienthalstraße 7-9  
63741 Aschaffenburg  
☎ +49 6021 40 27-0  
✉ info@philipp-gruppe.de

## PRODUCTION AND LOGISTICS

Hauptstraße 204  
63814 Mainaschaff  
☎ +49 6021 40 27-0  
✉ info@philipp-gruppe.de

## OFFICE COSWIG

Roßlauer Straße 70  
06869 Coswig / Anhalt  
☎ +49 34903 6 94-0  
✉ info@philipp-gruppe.de

## OFFICE NEUSS

Sperberweg 37  
41468 Neuss  
☎ +49 2131 3 59 18-0  
✉ info@philipp-gruppe.de

## OFFICE TANNHEIM

Robert-Bosch-Weg 12  
88459 Tannheim / Allgäu  
☎ +49 8395 8 13 35-0  
✉ info@philipp-gruppe.de

## PHILIPP VERTRIEBS GMBH

Pfaffing 36  
5760 Saalfelden / Salzburg  
☎ +43 6582 7 04 01  
✉ info@philipp-gruppe.at



HEADQUARTERS Aschaffenburg



Visit us! [www.philipp-group.de](http://www.philipp-group.de)