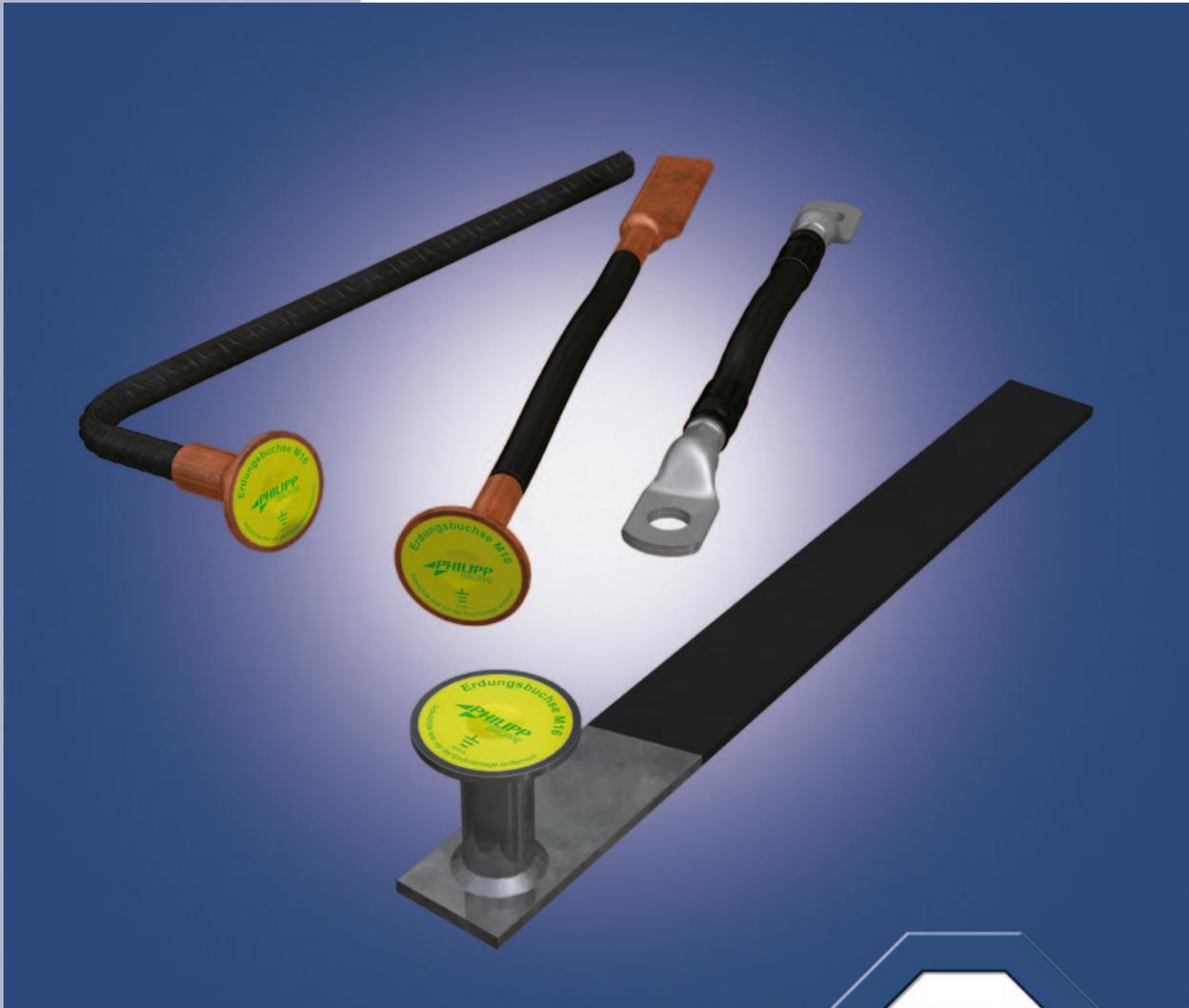


PHILIPP Earthing Technique

Product Overview



06/11 - EN



Committed. Competent. Your reliable partner.

www.philipp-group.de

Transport and Mounting Systems for Precast Units

- ▲ **Technical department** – our staff will be pleased to support you during your design process with suggestions for installation and use of our transport and mounting systems for precast units.
- ▲ **Special constructions** – individual for your special application.
- ▲ **Practical tests in plant** – we ensure that our concepts are customized.
- ▲ **Test reports** – for documentation and your safety.
- ▲ **Service** – our engineers will be pleased to train your technicians and staff at plant, consult during installation of precast units and help to optimise the production process.
- ▲ **High application safety of our products** – close cooperation with federal institute for material testing and – where required – German approvals of our products.
- ▲ **Software solutions** – design software for our sandwich anchor system and our power system (connecting technique).

▲ **Technical Department:**

Phone: +49 (0) 6021 / 40 27-318
Fax: +49 (0) 6021 / 40 27-329
Email: technik@philipp-gruppe.de

▲ **Sales Department:**

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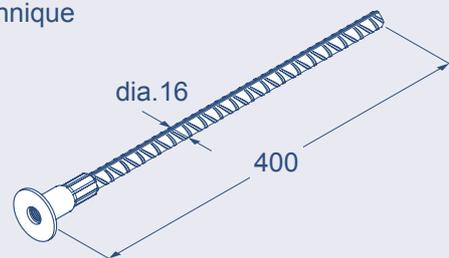


Table 1: Product Groups of the Earthing Technique

Type	Earthing Sleeves 71 EB	Earthing Connectors 71 EV
Examples		
Application	<ul style="list-style-type: none"> - Earthing of reinforcement in concrete constructions. 	<ul style="list-style-type: none"> - Reverse current conduction - Railway earthing - Potential equalization
Operation	<ul style="list-style-type: none"> - Creating an electrical connection point to the reinforcement. - Continuous connection of two connecting points through a concrete construction. - Electroconductive connection between different reinforcement layers. 	<ul style="list-style-type: none"> - Creation of an electroconductive connection between Earthing Sleeves.
Mounting	<ul style="list-style-type: none"> - Fixation on the mould with bolted joints or nails (option with nailholes). - If applicable welded connection with the reinforcement. 	<ul style="list-style-type: none"> - Bolted joint with Earthing Sleeves.

71 EB B16 . 01 - 0400

- Nominal length: **0400** = 400mm
- Version: **01** = One sided Earthing Sleeve, straight conductor
- Conductor: **B16** = Reinforcement steel dia.16
- Product: **EB** = Earthing Sleeve
- Article category: **71** = Earthing technique



Picture 1 Reference number

The PHILIPP Earthing Sleeve

PHILIPP Earthing Sleeves are used to create an earthing of the reinforcement in a concrete construction (e.g. acoustic wall). The Earthing Sleeve must be electroconductively connected by welding to the reinforcement. Attention has to be paid to the details for the welding joints specified in the drawings on page 16, 18 and 19. Only a qualified person, an approved welder, is allowed to do those welded joints to guarantee a proper conducting.

Different types of Earthing Sleeve are available due to each concrete construction provides variable space for the installation for Earthing Sleeve.

If a fixed connection between Earthing Sleeve and reinforcement is possible type **71 EB F40.01** and **71 EB B16.01** are used. Due to space constraints the bended types **71 EB F40.03** and **71 EB B16.03** are available.

To create a rigid and continuous connection through a concrete unit with two external connecting points type **71 EB F40.02** and **71 EB B16.02** can be chosen.

In case of a flexible connection between Earthing Sleeve and reinforcement is needed the types **71 EB K70.01** and **71 EB K95.01** based on copper cable can be installed. If different reinforcement layers within a concrete element should be connected electroconductively the types **71 EB K70.03** and **71 EB K95.03** are designed for.

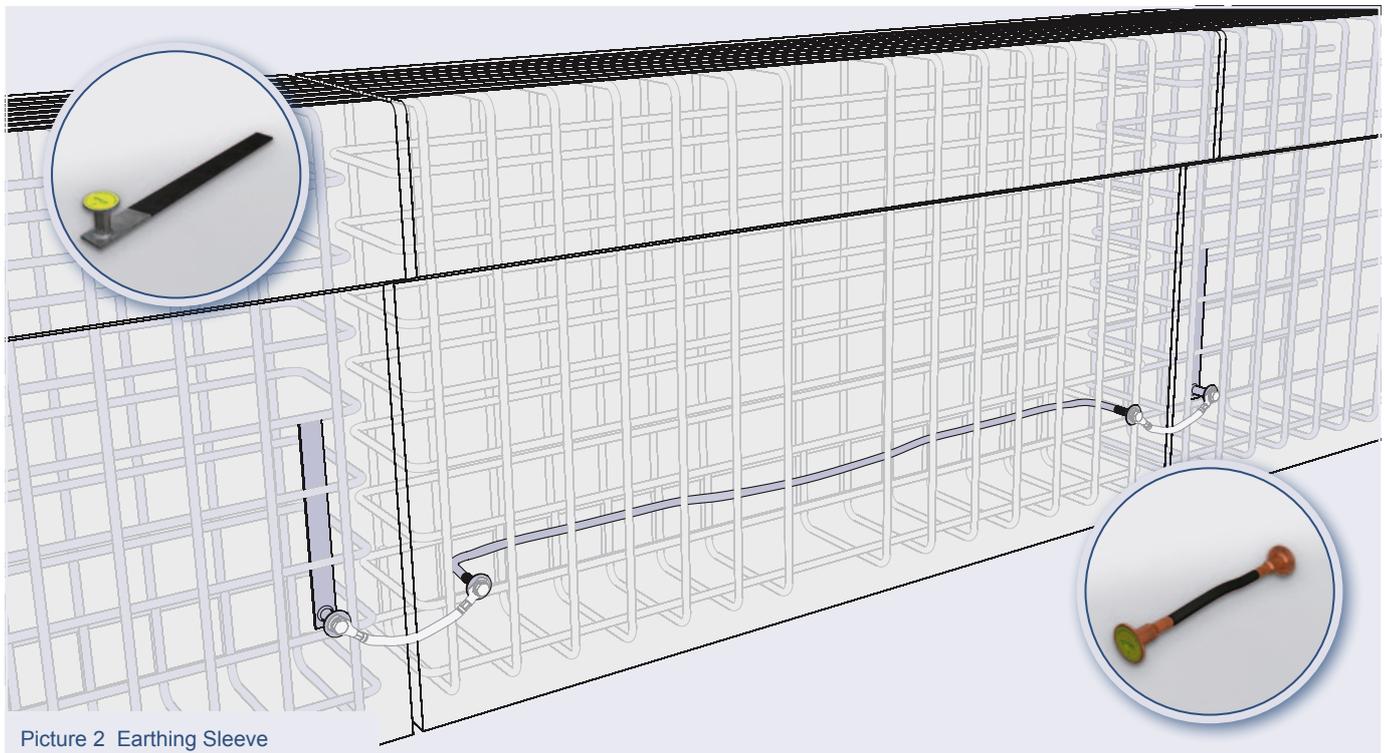
In order to connect two Earthing Sleeves inside a concrete unit with a flexible conductor type **71 EB K70.02** and **71 EB K95.02** are used.

As an option the Earthing Sleeves can be delivered with small nailholes in order to fix them to the mould. Overhang of the nails have to be flushed to the plate to avoid injuries and mounting problems.

Other versions and lengths of the **PHILIPP Earthing Sleeves** are available on request.

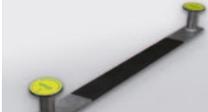
All **PHILIPP Earthing Sleeves** type **71 EB F40**, **71 EB B16** und **71 EB K95** are approved by the German Railway (Deutsche Bahn AG).

In addition type **71 EB F40.01** is also approved by the Austrian Railway (Österreichische Bundesbahn).



Picture 2 Earthing Sleeve

Table 2: Type Overview Earthing Sleeves

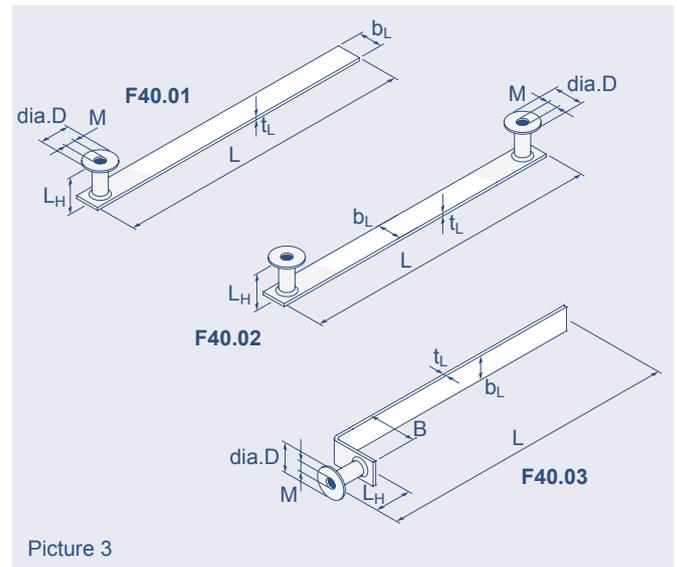
Type		Version	Product	Approvals
71 EB Earthing Sleeve	F40 Flat steel 40mm×5mm	01 Earthing Sleeve Straight flat steel		
		02 Double-sided Earthing Sleeve Straight flat steel		
		03 Earthing Sleeve 90° angled flat steel		
	B16 Reinforcing bar dia.16mm	01 Earthing Sleeve Straight reinforcing bar		
		02 Double-sided Earthing Sleeve straight reinforcing bar		
		03 Earthing Sleeve 90° angled reinforcing bar		
	K70 Copper cable 70mm ²	01 Earthing Sleeve Welding tongue		
		02 Double-sided Earthing Sleeve		
		03 Double-sided Welding tongue		
	K95 Copper cable 95mm ²	01 Earthing Sleeve Welding tongue		
		02 Double-sided Earthing Sleeve		
		03 Double-sided welding tongue		

Earthing Sleeve Type 71 EB F40

PHILIPP Earthing Sleeve type 71 EB F40 consists of a flat bar with a welded threaded sleeve. This threaded sleeve is build of a steel sleeve and a welded washer made of stainless steel. The ending of the Earthing Sleeve is completely galvanized in order to protect against corrosion. All types of Earthing Sleeves with a thread are covered with a removable protection until they will be mounted on building side.

The standard length of a flat bar is $L = 400$ mm and the height of the threaded sleeve $L_H = 53$ mm. Both dimensions can be changed on customers 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). As an option the threaded sleeve is also available with nail holes to fix it to the mould using stainless steel nails.



Picture 3

Table 3: Dimensions of the Earthing Sleeve Type 71 EB F40

Type	M [mm]	b_L [mm]	t_L [mm]	$A_L (b_L \times t_L)$ [mm ²]	L [mm]	B [mm]	dia.D [mm]	L_H [mm]
71 EB F40.01-0400	M16	40	5	200	400 (standard)	-	50	53
71 EB F40.02-0400	M16	40	5	200	400 (standard)	-	50	53
71 EB F40.03-0400	M16	40	5	200	400 (standard)	min. 50	50	53

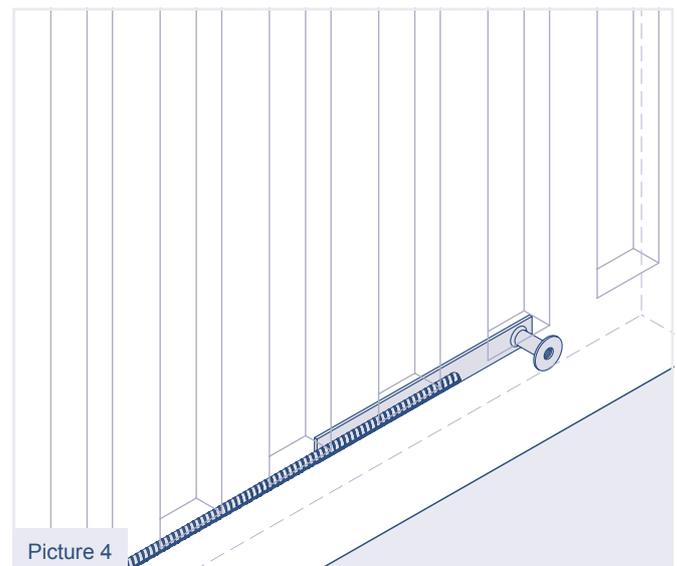
- Other lengths or versions also available on request.

Fixing

- Bolted connection M16
- Optional stainless steel pin

Approval

- German Railway (see page 16) (Deutsche Bahn AG)
- Austrian Railway (Type 71 EB F40.01, see page 17) (Österreichische Bundesbahn)

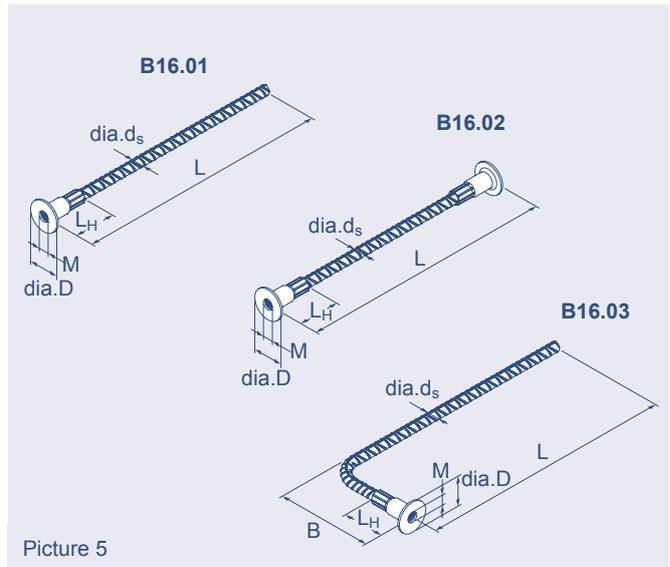


Picture 4

Earthing Sleeve Type 71 EB B16

Corresponding to the **PHILIPP Earthing Sleeve** with a flat bar the type **71 EB B16** consists of a rebar $\text{Ø}16\text{mm}$ as a conductor. With this type the threaded sleeve is crimped on the rebar. This threaded sleeve also consists of a steel sleeve with a welded washer made of stainless steel. The threaded sleeve of type **71 EB B16** is covered with a layer of copper which causes an additional protection against corrosion as well as a better conductivity. The actual thread is covered with a removable protection to avoid corrosion and dirt until mounting on building side.

The total length of the standard version is $L = 400\text{ mm}$ and the height of the threaded sleeve $L_H = 53\text{ mm}$. Both dimensions can be changed on customers request. As an option the threaded sleeve is also available with nail holes to fix it with stainless steel nails to the mould.



Picture 5

Table 4: Dimensions of the Earthing Sleeve Type 71 EB B16

Type	M [mm]	dia.d _s [mm]	A _L [mm ²]	L [mm]	B [mm]	dia.D [mm]	L _H [mm]
71 EB-B16.01-0400	M16	16	201	400 (standard)	-	50	53
71 EB B16.02-0400	M16	16	201	400 (standard)	-	50	53
71 EB B16.03-0400	M16	16	201	400 (standard)	min. L _H + 70	50	53

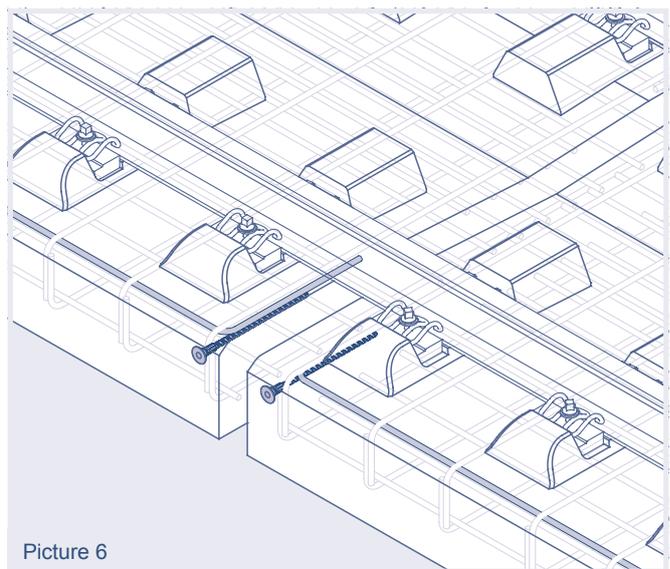
- Other lengths or versions also available on request.

Fixing

- Bolted connection M16
- Optional stainless steel pin

Approval

- German Railway (see page 18) (Deutsche Bahn AG)



Picture 6

Earthing Sleeve Type 71 EB K70 / 71 EB K95

The **PHILIPP Earthing Sleeve** type **71 EB F70** consists of a flexible copper cable with a cross section of 70mm² and 95mm² as a conductor. This Earthing Sleeve is available with a crimped-on threaded sleeve for screwing as well as crimped-on welding tongue for welding to the reinforcement. The welding tongue is made of a pressed steel tube. Both, the threaded insert and the welding straps are covered with a layer of copper to increase the conductivity and to protect against corrosion. The thread is covered with a removable protection to avoid corrosion and dirt until mounting on building side.

The standard total length is $L = 400$ mm and can be modified on request. The length L_s of the welding strap can be produced in a length between 80 and 150 mm.

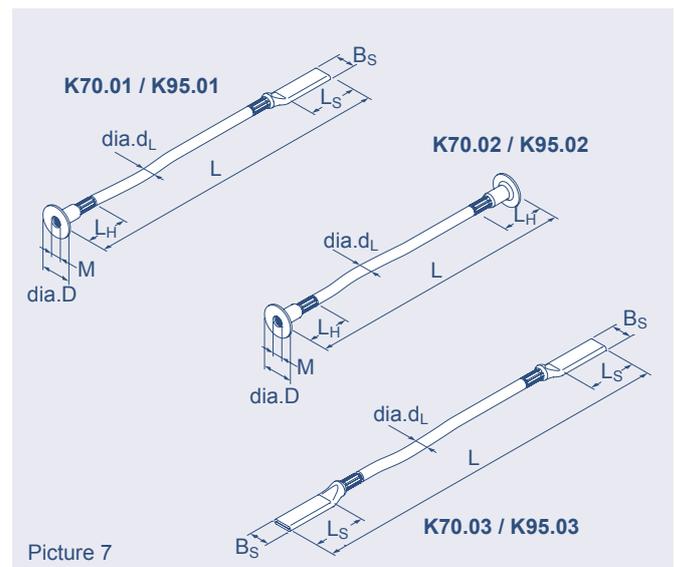


Table 5: Dimensions of the Earthing Sleeve Type 71 EB K70 / K95

Type	M [mm]	dia.d _L [mm]	A _L [mm ²]	L [mm]	dia.D [mm]	L _H [mm]	B _S [mm]	L _S [mm]
71 EB K70.01-0400	M16	17,0	70	400 (standard)	50	53	30	80
71 EB K70.02-0400	M16	17,0	70	400 (standard)	50	53	-	-
71 EB K70.03-0400	M16	17,0	70	400 (standard)	-	-	30	80
71 EB K95.01-0400	M16	19,2	95	400 (standard)	50	53	30	80
71 EB K95.02-0400	M16	19,2	95	400 (standard)	50	53	-	-
71 EB K95.03-0400	M16	19,2	95	400 (standard)	-	-	30	80

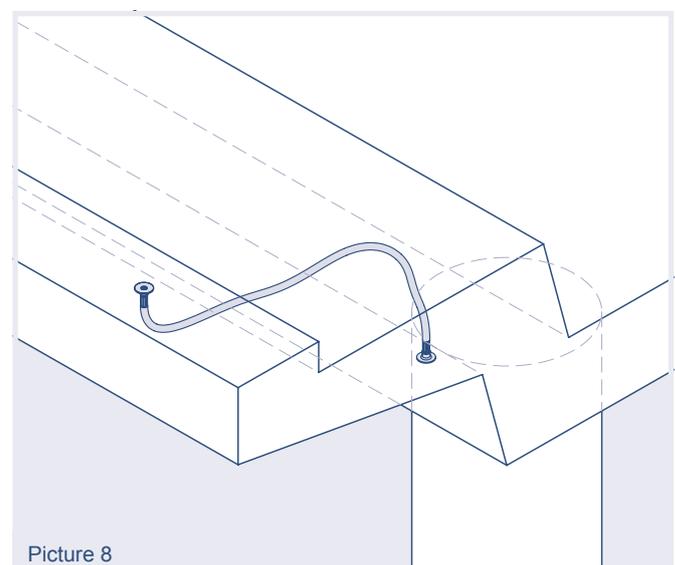
- Other lengths or versions also available on request.

Fixing

- Bolted connection M16
- Optional stainless steel pin
- Welded connection

Approval

- German Railway (see page 19)
(Deutsche Bahn AG)



The PHILIPP Earthing Connector

PHILIPP Earthing Connectors are used to create an electroconductive connection of concrete units, e.g. platform base plates or steel elements as handrails in areas of high voltage power lines inside railway facilities.

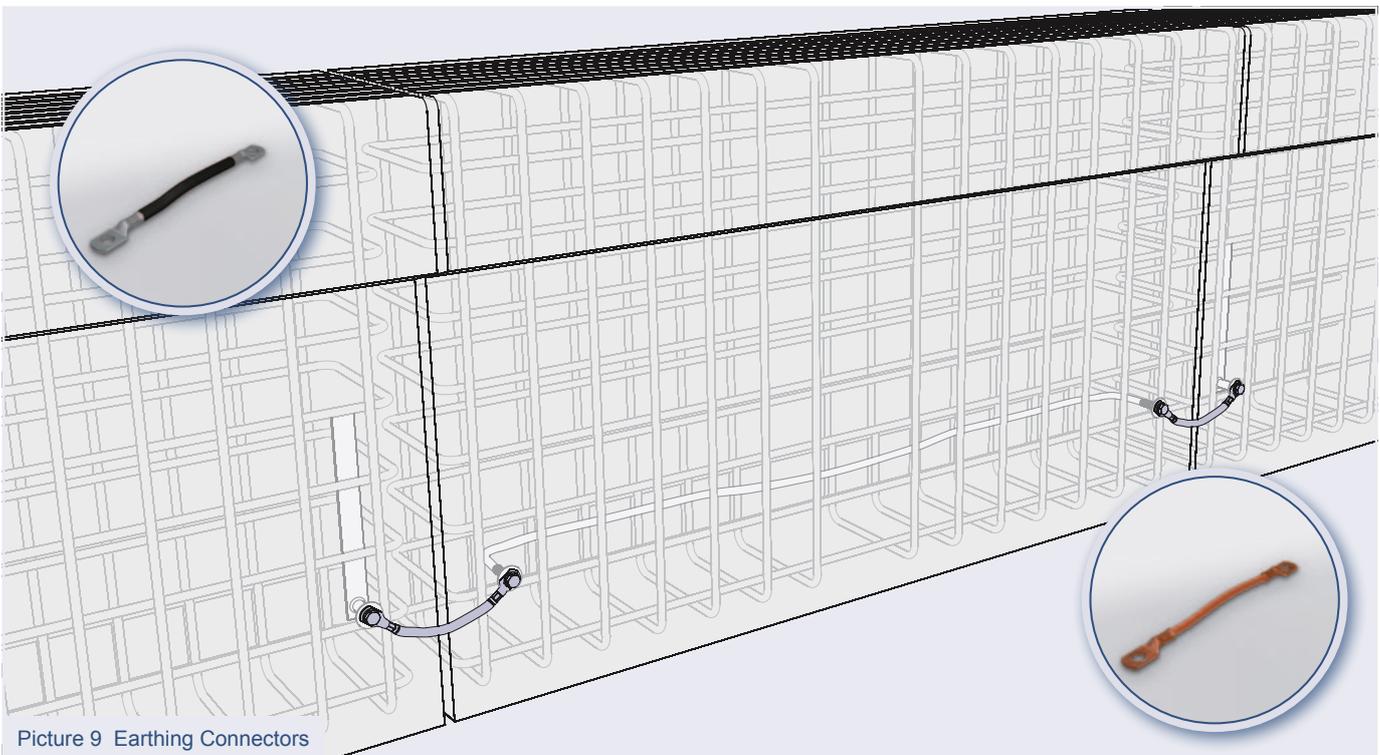
The endings of the Connector are crimped with cable lugs according to DIN 48083 and can be fixed with bolted connections to **PHILIPP Earthing Sleeves** at the concrete elements.

Basically **PHILIPP Earthing Connectors** differ only in used cable types. A PVC covered copper cable as a connector is offered for type **71 EV K50.01** and **71 EV K70.01**. Also a PVC covered copper cable but free of halogen is available for type **71 EV K50.02** and **71 EV K70.02**.

PHILIPP Earthing Connector type **71 EV S95** is made on steel rope.

A correct type of **PHILIPP Earthing Connector** has to be chosen depending on the application. For instance for tunnel constructions Earthing Connectors free of halogen has to be taken, in case of fire this kind of cable causes less poisonous steam compared to a standard cable.

In order to avoid a possible theft of expensive material such as copper the use of the technical equal steel cable version is suggested, because of the cheaper raw material. The **PHILIPP Earthing Connector** type **71 EV S95** has equal electrical conduction properties to the type **71 EV K50.01**.



Picture 9 Earthing Connectors

Table 6: Type Overview Earthing Connector

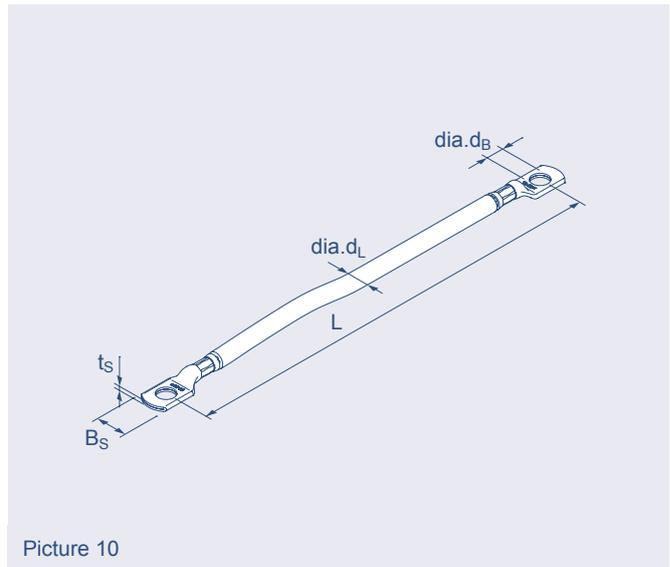
Type		Version	Product	Approvals
71 EV Earthing connector	K50 Copper cable 50mm ²	01 PVC-Cable coating Double-sided cable lug		
		02 Non-halogen cable coating Double-sided cable lug		
		03 Without cable coating Double-sided bright cable lug		
	K70 Copper cable 70mm ²	01 PVC-Cable coating Double-sided cable lug		
		02 Non-halogen cable coating Double-sided cable lug		
	S95 Steel rope 95mm ²	01 PVC-Cable coating Double-sided cable lug		

Earthing Connector Type 71 EV K50 / K70

PHILIPP Earthing Connector types 71 EV K50.01 and 71 EV K70.01 are produced of a copper cable NYY-0 as a conductor and two galvanic tinned cable lugs according to DIN 46235 at both ends. The halogen free version made of copper cable N2XH-0 as a conductor is defined as type **71 EV K50.02 / 71 EV K70.02**.

The standard hole centre distance of the Earthing Connectors is $L = 300$ mm; on request other lengths respectively distances are available. The holes in the cable lugs are designed to have a fixation 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 10

Table 7: Dimensions of the Earthing Connectors Type 71 EV K50 / K70

Type	dia.d _B [mm]	dia.d _L [mm]	A _L [mm ²]	L [mm]	B _S [mm]	t _S [mm]
71 EV K50.01-0300	17	15,4	50	300 (standard)	30	4,5
71 EV K50.02-0300	17	15,4	50	300 (standard)	30	4,5
71 EV K50.03-0300	17	9,0	50	300 (standard)	30	4,5
71 EV K70.01-0300	17	17,0	70	300 (standard)	32	5,0
71 EV K70.02-0300	17	17,0	70	300 (standard)	32	5,0

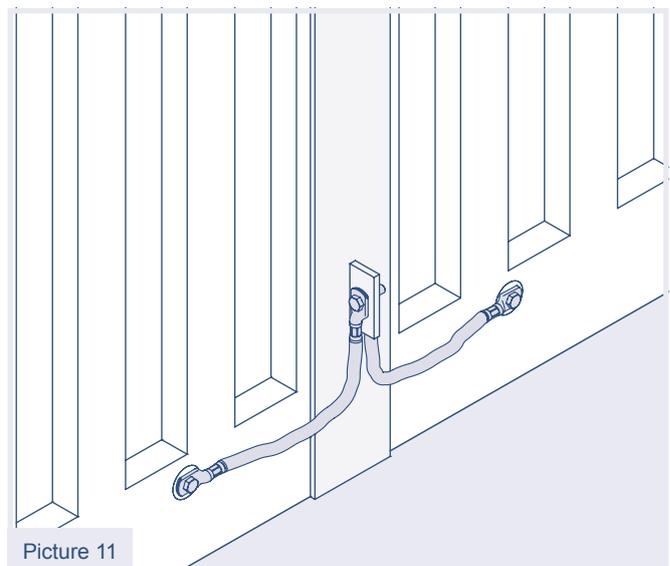
- Other lengths or versions also available on request.

Fixing

- Bolted connection M16

Approval

- German Railway (Ebs 15.03.17)
(Deutsche Bahn AG)
- Austrian Railway (Type 71 EV K50.03)
(Österreichische Bundesbahn)

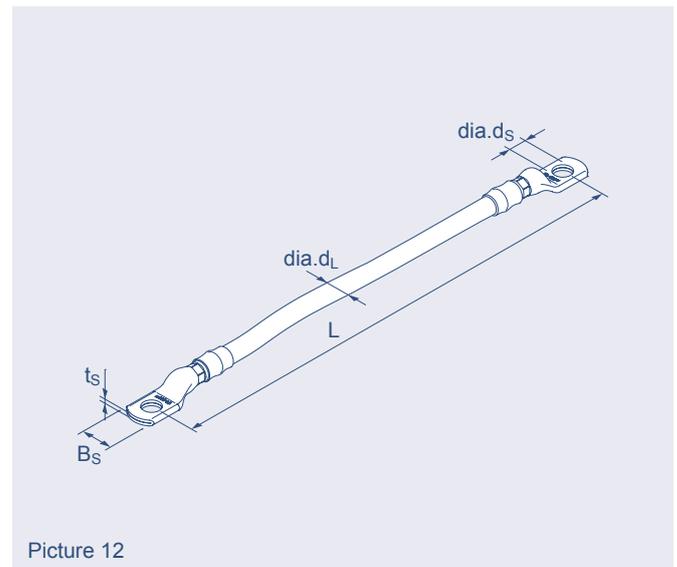


Picture 11

Earthing Connector Type 71 EV S95

A steel cable instead of copper is used with type **71 EV S95** as a conductor. The cable lugs (according to DIN 46235) are same as used with the copper version. Here the use of a shrunk on protective hose against corrosion at the connections is standard.

The standard hole centre distance of the Earthing Connectors is $L = 300$ mm, on request other lengths respectively distances are available. The holes in the cable lugs are designed to do a fixation with stainless steel screws of size M16.



Picture 12

Table 8: Dimensions of the Earthing Connectors Type 71 EV S95

Type	$dia.d_B$ [mm]	$dia.d_L$ [mm]	A_L [mm ²]	L [mm]	B_S [mm]	t_s [mm]
71 EV-S95.01-0300	17	19,5	95	300 (standard)	32	5,5

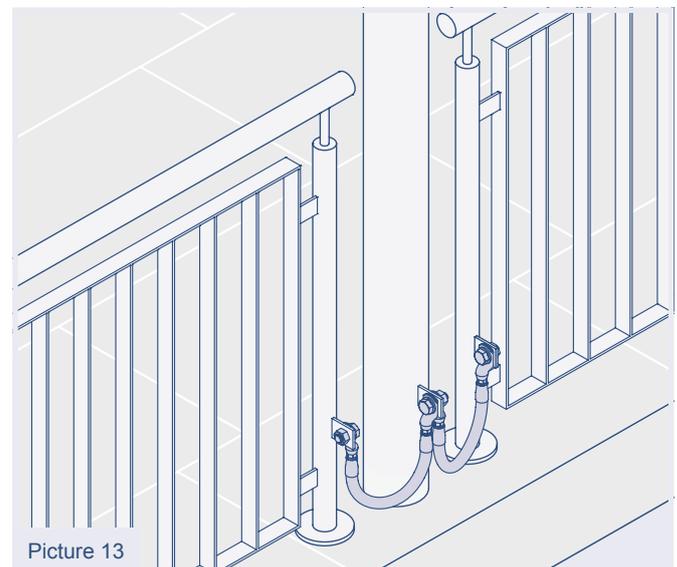
- Other lengths or versions also available on request.

Fixing

- Bolted connection M16

Approval

- German Railway (Ebs 15.03.17)
(Deutsche Bahn AG)

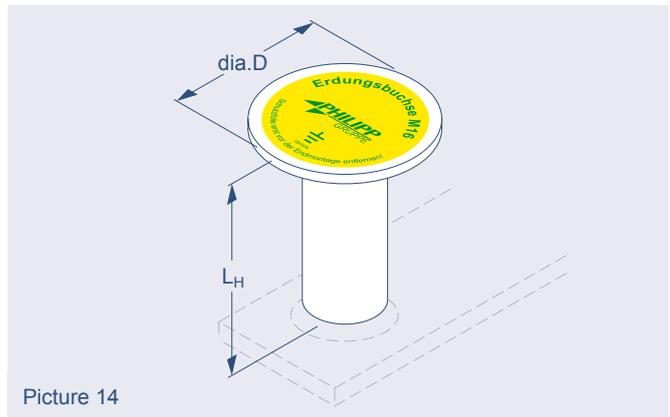


Picture 13

Sleeve for welding on a flat steel

PHILIPP Earthing Sleeve is used to create a welded connection on a flat bar on building.

The use of **PHILIPP Earthing Sleeve** has to be technically checked and can only be used in applications where an approval of Deutsche Bahn AG or Österreichische Bundesbahn is not required.



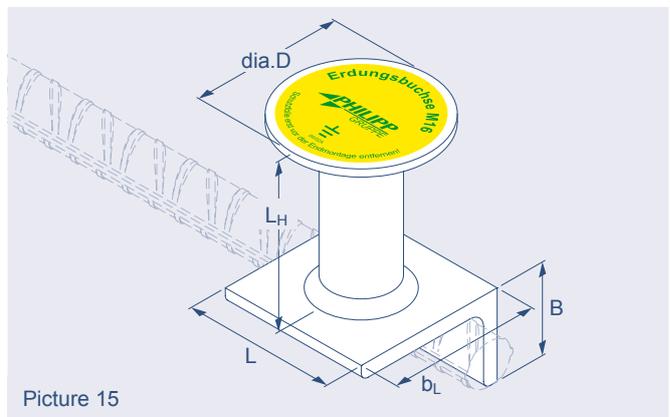
Picture 14

Sealing plate for welding on a reinforcing bar

PHILIPP Earthing Sleeve with welding plate is used for creating connections on building site with reinforcement or round bar.

Please take into consideration that the minimum cross section of the conducting material has to be 200mm².

The use of **PHILIPP Earthing Sleeve** has to be technically checked and can only be used in applications where approval of Deutsche Bahn AG or Österreichische Bundesbahn is not required.

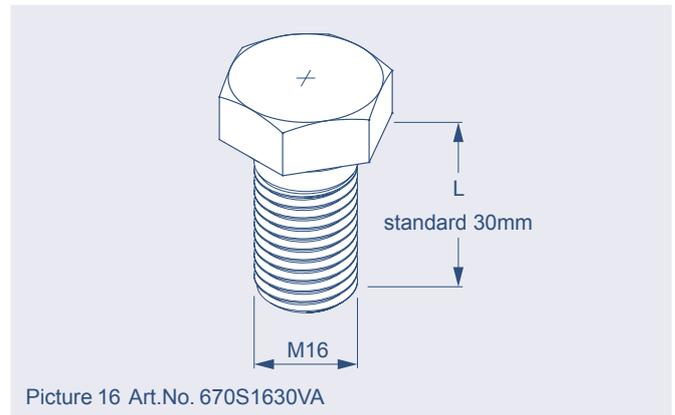


Picture 15

Fixing Screw

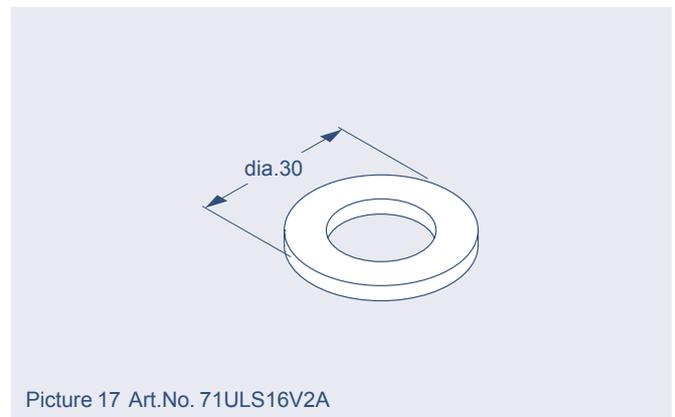
Screw ISO 4017 (DIN 933) – 16 × Length L – A2

Other lengths are available on request.



Flat Washer

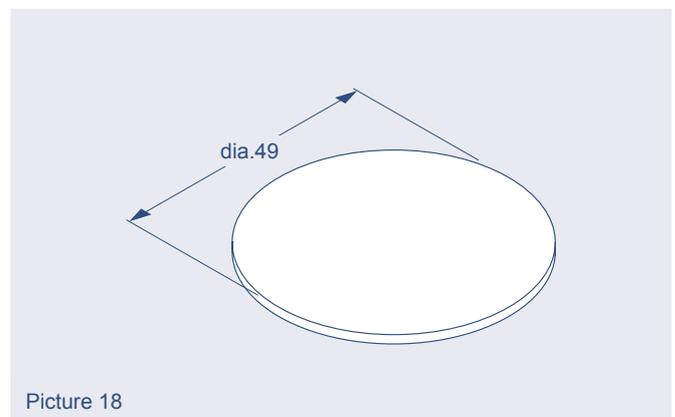
Washer ISO 7089 (DIN 125 A) – 16 – A2



Adhesive Label

For fixing **PHILIPP Earthing Sleeve** to a steel mould a both-sided adhesive label can be used.

After demoulding it must be checked if the label is still legible und still protecting the thread. If not it has to be replaced.



1 2 3 4 5 6 7 8

Abmessungen Erdungsbuchse

F40.01
F40.02
F40.03

Verbindungen mit Schalung

Anschluss Erdungskabel

Kenntzeichnung (Aufkleber)

(Prägung)

Anschluss der Gewindehülse

Verschweißen

- Lichtbogenschweißen
- Einzellänge der Schweißnaht min. 45 mm
- Gesamtlänge der Schweißnaht min. 90 mm

Anwendungsbeispiele

geeignet für Bereiche $I_k > 25$ kA

3 Ebs 15.03.19 - 11

8 7 6 5 4 3 2 1

Verwendbar für:
Rückstromführung
Bühnenführung
Potentialausgleich

DB gesehen
Frankfurt am Main
ITZ 242

Bezeichnung/Art-Nr.	Datum	Name
Erdungsbuchse Typ 71 EB F40	10.12.10	M. B. B. B.
	10.12.10	M. B. B. B.

Planproj. 1:1, A. 0

PHILIPP GRUPPE
Hauptgeschäftsbereich
B-3741 Aschaffenburg
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Tel. +49 9381 807 43 21 43

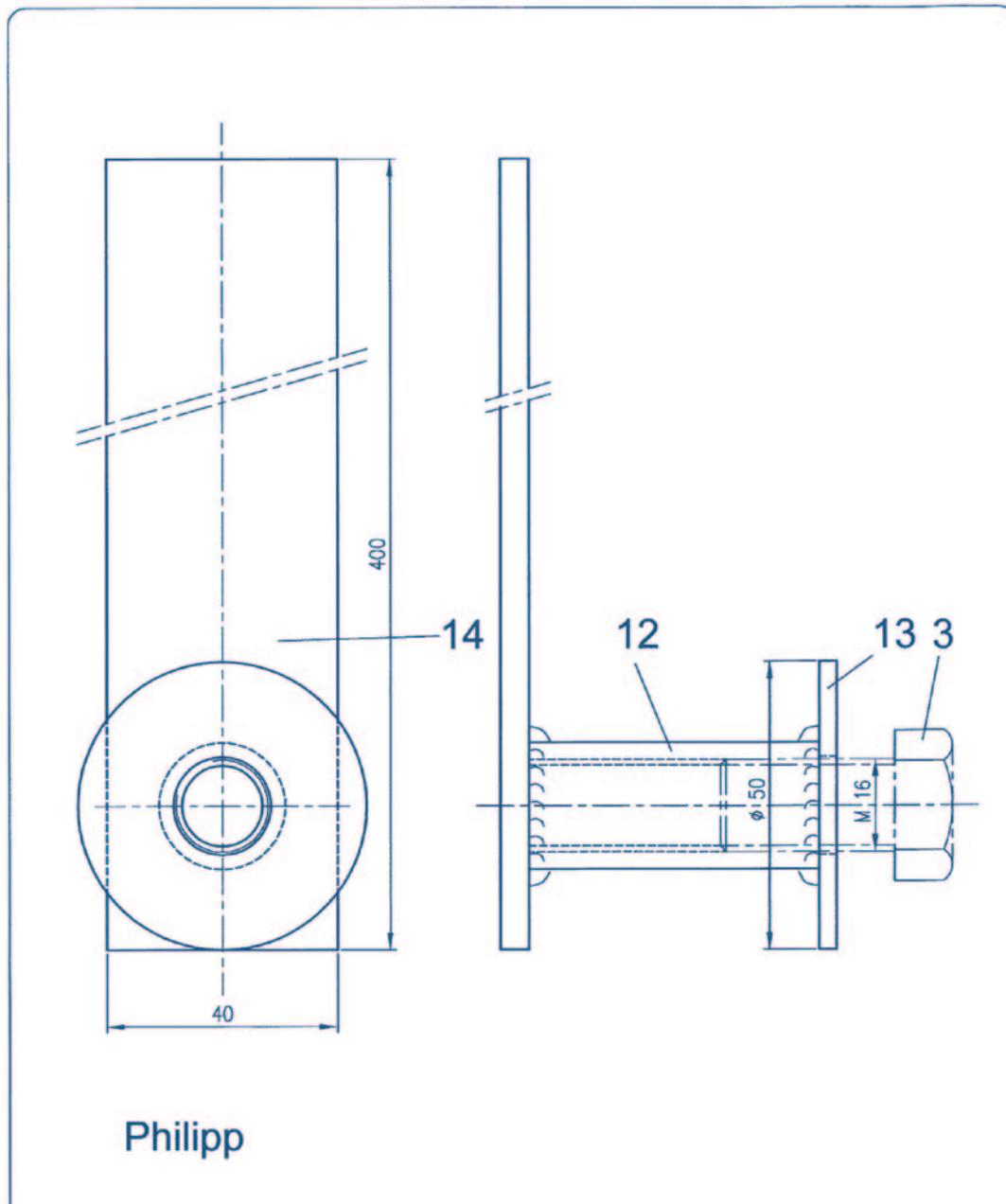
Ziehungsnummer: 71 EB F40

Blatt 1
1 Bl

Stand	Änderung	Datum	Name

Ers. v. Ebs 15.03.19 Bl.11 Auss. 02/06 Ers. d. -

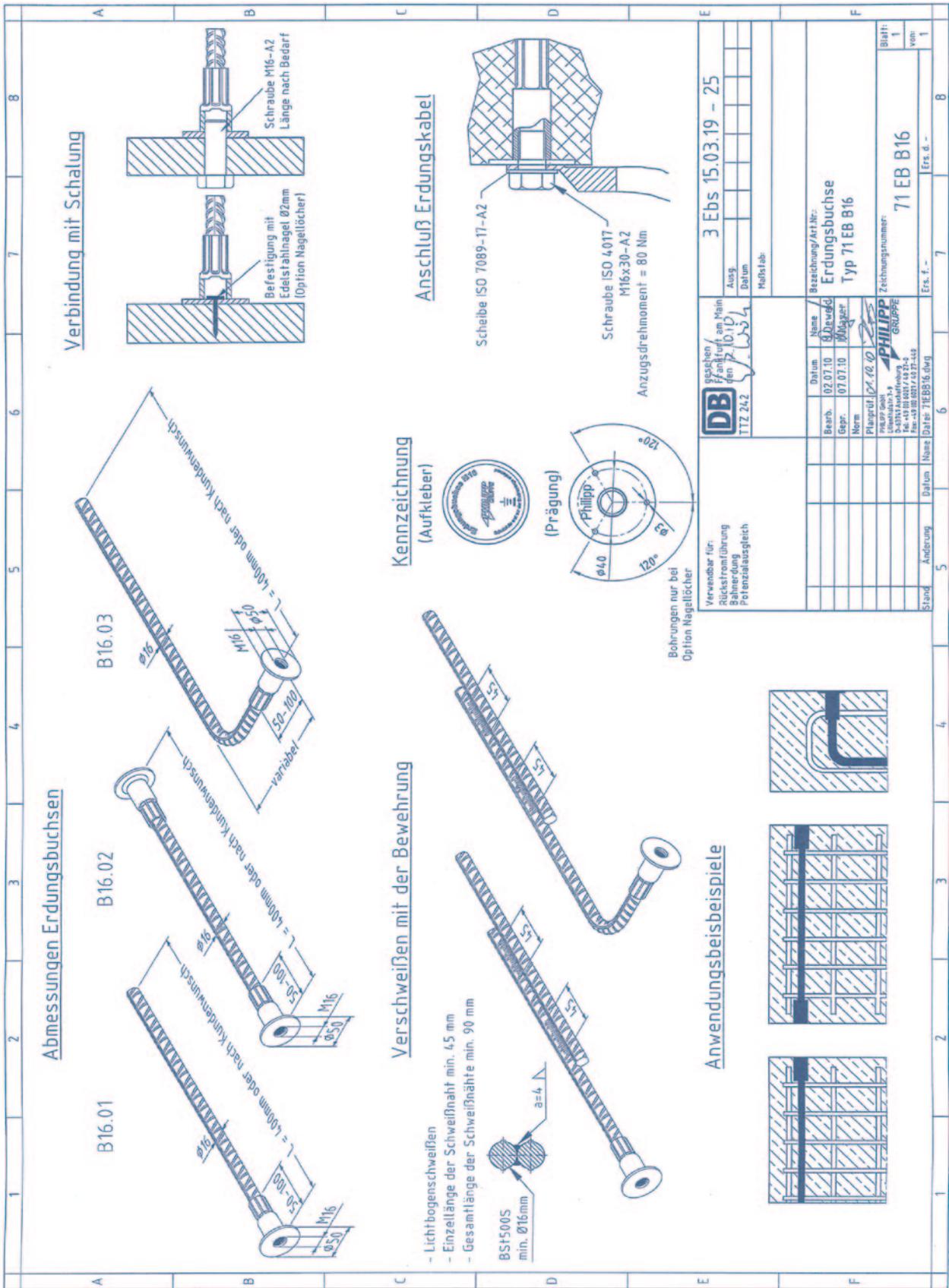
Verfertigung und Verwertung nur für Zwecke der DB AG frei



	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.

Anderung:

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



nur für Zwecke der DB AG frei
Vervielfältigung und Verwertung

Ropes

- ▲ wire rope slings
- ▲ crane and forest ropes
- ▲ wire, hemp and polyamide ropes
- ▲ hoisting and special ropes
- ▲ polypropylene ropes
- ▲ rope connections



Lifting, attachment and lashing equipment

- ▲ load restraint systems
- ▲ RUD sling chains
- ▲ load suspension devices
- ▲ round slings, sling bands and lifting equipment
- ▲ rope and chain accessories
- ▲ lifting beams



Transport and mounting systems for prefabricated units

- ▲ transport anchors
- ▲ spherical-head anchor system
- ▲ fixing sockets
- ▲ connecting technique



Hydraulic, pneumatics and conveyor technique

- ▲ hydraulic units and components
- ▲ pneumatic, connector systems and accessories
- ▲ Hoses, fittings and accessories
- ▲ machines, tools, machinery systems and accessories

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