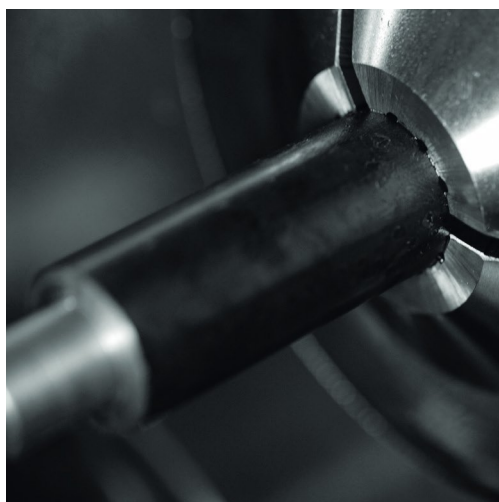
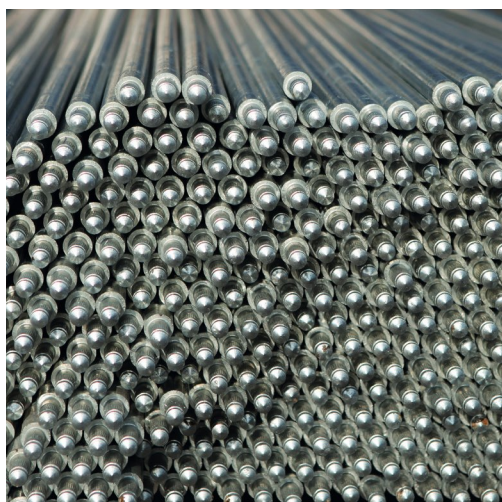


# 6 EARTHING SYSTEMS & ACCESSORIES

# 2024

1st EDITION



**Bezpol**



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# 1. VERTICAL EARTHING COMPONENTS

## 1.1. UPB TYPE EARTHING ROD

### Material:

Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Fastening and sealing component.

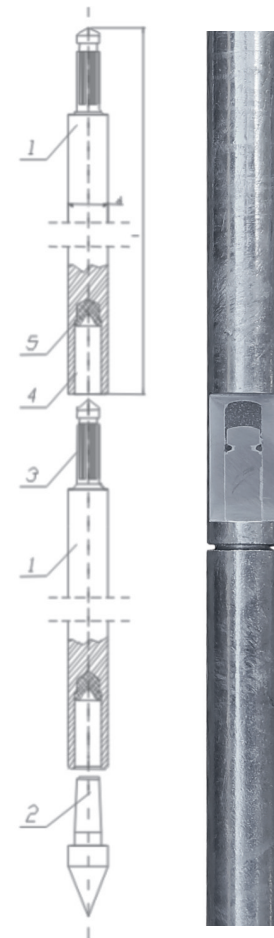
### Intended use:

Driven earthing rods are intended for vertical earth electrodes by means of impact hammers.

### Mounting method:

Connection of subsequent rods is effected by means of plastic deformation of insert made of plastic metal (5), pressed in at the bottom of seat (4) under action of forces generated by driving.

A mandrel with splines (3) introduced into seat (4) deforms insert (5), which results in filling free spaces of the seat and creation of shaped lock (picture), simultaneously sealing the joint. The spiked tip (2) made of steel ensures easy driving of earthing electrodes even in grounds of high compactness. Lack of fittings, enlarging outer diameter of rods, enables execution of effective earth electrode efficiency directly after driving has been finished.



BK 9100 to BK 9104,  
BK 9127 and BK 9128

Catalogue no.	KTM	Type UPB16	Dimensions [mm]	
			d Rod diameter	l Rod length
BK9100	0625-489-161-300	Earthing rod Ø16/1300 - hot galvanized	16	1300
BK9101	0625-489-161-500	Earthing rod Ø16/1500 - hot galvanized	16	1500
BK9102	0625-489-000-016	Spiked tip for Ø16 earthing rod	16	-
UPB18				
BK9127	0625-489-181-500	Earthing rod Ø18/1500 - hot galvanized	18	1500
BK9128	0625-489-000-018	Spiked tip for Ø18 earthing rod	18	-
UPB20				
BK9103	0625-489-201-500	Earthing rod Ø20/1500 - hot galvanized	20	1500
BK9104	0625-489-000-020	Spiked tip for Ø16 earthing rod	20	-

## 1.2. UP2B TYPE EARTHING ROD

### Intended use:

Implementation of earthing systems and points in normal field conditions

### Construction:

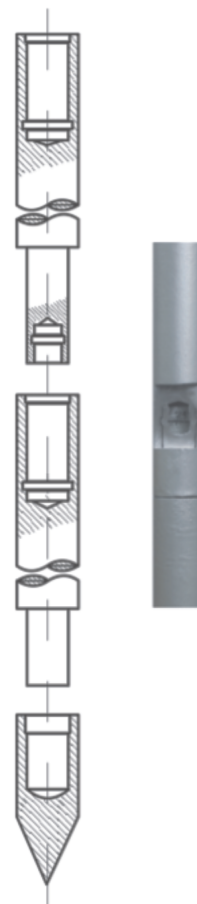
UP2B type earthing rod

(hot galvanized steel acc. to PN-EN ISO1461)

Spiked tip for UP2B earth electrode

### Operating principle:

Earthing is created by driving subsequent earthing rods (1) into ground, where first of them is ended with spiked tip. Connection of subsequent rods is done by placing shaped mandrel of earth electrode being driven into the seat of the one drove previously, and driving the set by means of impact hammers. The axial striking forces, acting on the joint, result in deformation of mandrel shaped tip, which sets into the seat and fills free spaces, thus joining subsequent rod while simultaneously sealing the joint. This ensures perfect mechanical and electrical properties of the connection, as well as high corrosion resistance. The spiked tip and lock elements have the same diameters as the rest of the earth electrode, therefore they do not batter the hole and provide firm contact with ground on the whole length of earthing. This enables measurement of earthing effectiveness directly following driving a probe in.



BK 9105 and BK 9106

### Advantages:

uniform diameter on the whole length of earth electrode enables measurement of earthing effectiveness directly after the earth electrode has been driven; simple and sure method of connecting subsequent elements, providing excellent mechanical and electrical properties of the joint; hot galvanizing ensures corrosion resistance; relatively low weight, which enables easy transportation in the field; possibility of driving in by means of all impact hammers available on the market.

Catalogue no.	KTM	Type	Dimensions [mm]	
			d Rod diameter	l Rod length
BK9105	0625-489-161-530	UP2B16 Earthing rod Ø16/1500 - hot galvanized	16	1500
BK9106	0625-489-001-016	The Spiked tip for Ø16 earth electrode	16	-

### 1.3. UPBZ TYPE POINTED EARTHING ROD

#### Material:

Hot galvanized steel acc. to PN-EN ISO 1461 standard.

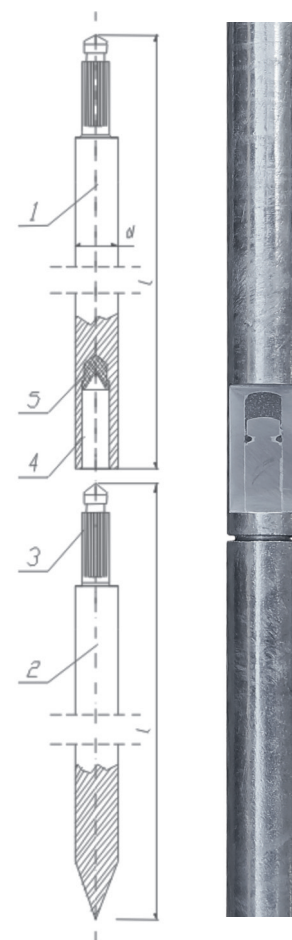
Fastening and sealing component.

#### Intended use:

Driven earthing rods are intended for vertical earth electrodes by means of impact hammers.

#### Mounting method:

The tip of UPBZ earth electrode is pointed, so it does not require spiked tip utilisation. The rod can be applied as single earth electrode, or is driven in as the first one and subsequently elongated by means of UPB type earth electrodes. Connection of subsequent rods is then effected by means of plastic deformation of insert made of plastic metal (5), pressed in at the bottom of seat (4) under action of forces generated by driving. A mandrel with splines (3) introduced into seat (4) deforms insert (5), which results in filling free spaces of the seat and creation of shaped lock (picture), simultaneously sealing the joint.



BK 9107 to BK 9110

Catalogue no.	KTM	Type	Dimensions [mm]	
			d Rod diameter	l Rod length
		UPBZ16		
BK9107	0625-489-161-310	Earthing rod Ø16/1300 - pointed tip	16	1300
BK9108	0625-489-161-510	Earthing rod Ø16/1500 - pointed tip	16	1500
		UPBZ20		
BK9109	0625-489-201-310	Earthing rod Ø20/1300 - pointed tip	20	1300
BK9110	0625-489-201-510	Earthing rod Ø20/1500 - pointed tip	20	1500

## 1.4. UPBP TYPE EARTHING ROD

**Material:**

Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Fastening and sealing component.

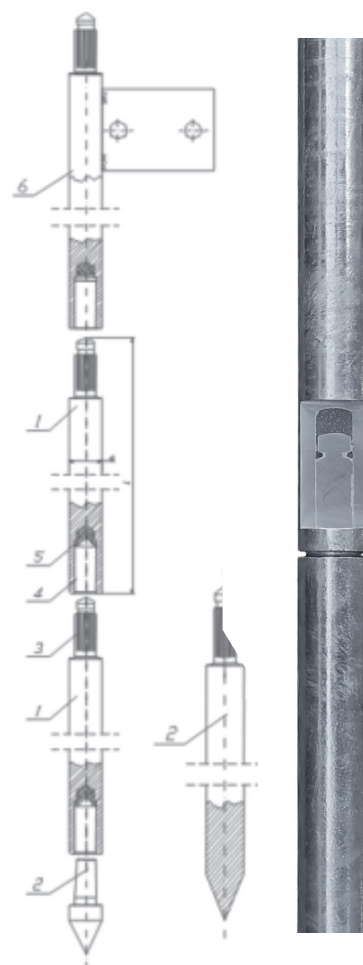
**Intended use:**

Driven earthing rods are intended for vertical earth electrodes by means of impact hammers. There is a connecting tang made on the upper end of UPBP earth electrode that enables screwing the hoop iron directly at earth electrode (without use of earthing clamps).

**Mounting method:**

The rod can be used as single element (either in pointed version or with use of standard spiked tip), or it may constitute termination of grounding set made with UPB type earth electrodes. Connection of subsequent rods proceeds in analogous way as in case of UPB earth electrodes by plastic deformation of insert made of plastic metal (5) pressed in the bottom of seat (4) under action of forces generated by driving them in. A mandrel with splines (3) introduced into seat (4) deforms the insert (5), effecting filling free spaces of the seat and creating shaped lock.

If the hoop iron being fastened, 10.5 mm diameter holes are drilled spaced each 45mm then fastened to their tang by means of M 10 bolts.



BK 9111 and BK 9112

Catalogue no.	KTM	Type	Dimensions [mm]	
			d Rod diameter	l Rod length
UPBP16				
BK9111	0625-489-161-540	Earthing rod Ø16/1500 - with fastener welded to UP hoop iron.	16	1500
UPBZ20				
BK9112	0625-489-201-540	Earthing rod Ø20/1500 - with fastener welded to UP hoop iron.	20	1500



## 1.5. UPBKP TYPE EARTHING ROD

### Material:

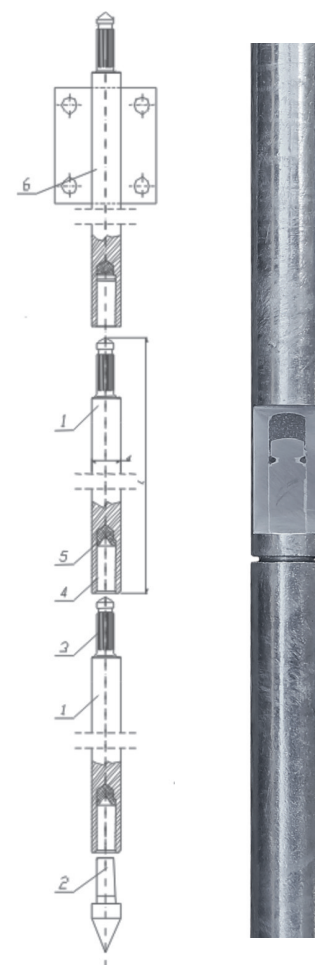
Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Fastening and sealing component.

### Intended use:

Driven earthing rods are intended for vertical earth electrodes by means of impact hammers. There is a connecting clamp made on the upper end of UPBKP earth electrode that enables screwing the hoop iron directly at earth electrode (without use of earthing clamps).

### Mounting method:

The rod can be used as single element (either in pointed version or with use of standard spiked tip), or it may constitute termination of earthing set made with UPB type earth electrodes. Connection of subsequent rods is then effected in the same way as in case of UPB earth electrodes, by means of plastic deformation of insert made of plastic metal (5), pressed in at the bottom of seat (4) under action of forces generated by driving. A mandrel with splines (3) introduced into seat (4) deforms insert (5), which results in filling free spaces of the seats and creation of shaped lock. The hoop iron being fastened is placed in the clamp and fixed by means of set screws.



BK 9113 and BK 9114

Catalogue no.	KTM	Type	Dimensions [mm]	
			d Rod diameter	l Rod length
		UPBKP16		
BK 9113	0625-489-161-530	Earthing rod Ø16/1500 - with fastener welded to UKP hoop iron.	16	1500
		UPBKP20		
BK 9114	0625-489-201-530	Earthing rod Ø20/1500 - with fastener welded to UKP hoop iron.	20	1500

## 1.6. URB TYPE EARTHING PIPE

**Material:**

Hot galvanized steel acc. to PN-EN ISO 1461 standard.

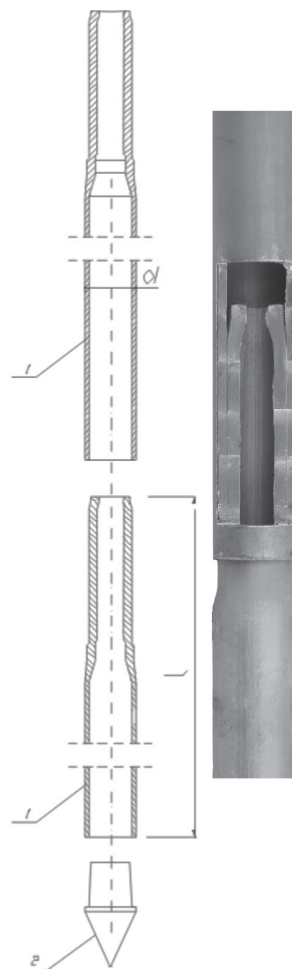
**Intended use:**

Implementation of earthing systems in difficult field conditions, particularly in case of soils with high contents of chippings and gravel soils, precluding driving of earth electrodes to high depth, and in all places where attaining low earth resistance is needed with use of low number of earth electrodes (areas developed with utilities, areas with compact settlement).

**Mounting method:**

Earthing is created by driving subsequent earthing pipes (1) into ground, where first of them is ended with spiked tip. The connection is made by inserting overlapped pipe end into the second pipe, on the principle of belling lock.

The spiked tip and lock elements have the same outer diameter as the rest of the earth electrode, therefore they do not batter the hole and provide firm contact with ground on the whole length of earthing. This enables measurement of earthing effectiveness directly following driving a probe in.



BK 9115 and BK 9116

Catalogue no.	KTM	Type	Dimensions [mm]	
			d Rod diameter	l Rod length
		URB 27		
BK9115	0625-489-271-500	EARTHING PIPE Ø27/1500	27	1500
BK9116	0625-489-027-030	URB 27 earthing pipe spiked tip	-	-

## 1.7. URBS SYSTEM

### Material:

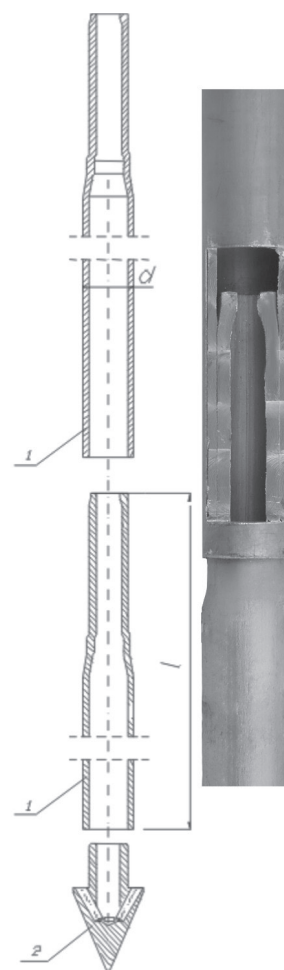
Hot galvanized steel acc. to PN-EN ISO 1461 standard.

### Intended use:

Implementation of chemically boosted earthing systems and points in difficult field conditions with high natural soil resistivity: sand soils, places having low level of subsurface water, ex-industrial areas (landfills, heaps).

### Mounting method:

Earthing in URBS system is built of URB type earth pipes, equipped with special URBS type spiked tip. It has axial no-go opening and connected with it radially side through openings. Maximum diameter of the spiked tip is greater than outer diameter of earth electrode. In effect of driving in, the spiked tip batters the hole and causes creation of free annular space between outer surface of earth electrode and hole wall in the soil, into which water suspension of AM 2005 agent is introduced, resulting in soaking of earthing set vicinity with substance lowering soil resistivity.

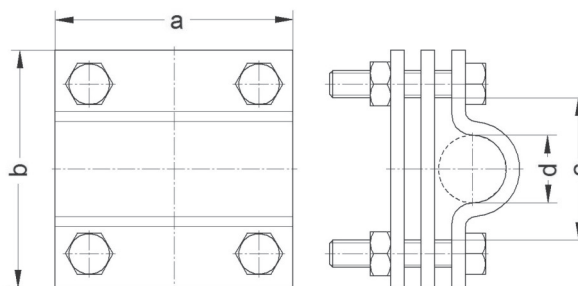
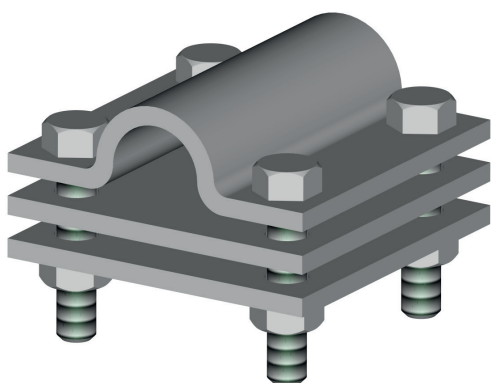


BK 9115 and BK 9118

Catalogue no.	KTM	Type	Dimensions [mm]	
			d Rod diameter	1 Rod length
		URBS 27		
BK9115	0625-489-271-500	EARTHING PIPE Ø27/1500	27	1500
BK9118	0625-489-027-035	URBS 27 earthing pipe spiked tip	-	-

## 2. CONNECTIONS

### 2.1. UKU ... /40/ ... TYPE EARTHING CLAMP



BK 9000 to BK 9005

**Material:**

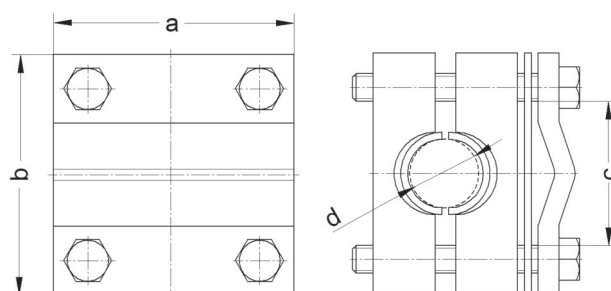
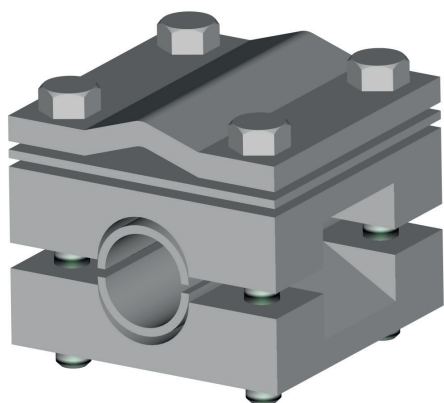
Hot galvanized steel acc. to PN-EN ISO 1461 standard.

**Intended use:**

For implementation of earthing rods or pipes connections with flat earthing bar (hoop iron), having up to 40 mm width.

Catalogue no.	KTM	Type	Dimensions [mm]			
			a	b	c	d
BK9000	0654-291-425-162	UKU 16/40/2	70	40	70	16
BK9000/1	0654-291-425-182	UKU 18/40/2	70	40	70	18
BK9001	0654-291-425-202	UKU 20/40/2	70	40	70	20
BK9002	0654-291-425-272	UKU 27/40/2	70	40	70	27
BK9003	0654-291-425-164	UKU 16/40/4	70	40	70	16
BK9003/1	0654-291-425-184	UKU 18/40/4	70	40	70	18
BK9004	0654-291-425-204	UKU 20/40/4	70	40	70	20
BK9005	0654-291-425-274	UKU 27/40/4	70	40	80	27

2.2. UKUż ... /40/ ... TYPE EARTHING CLAMP



BK 9006 to BK 9008

**Material:**

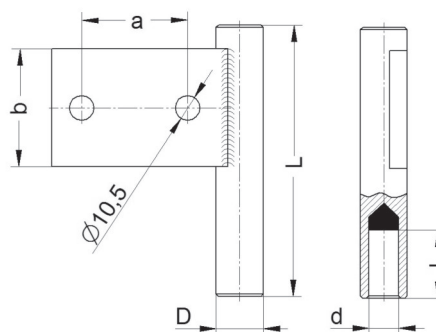
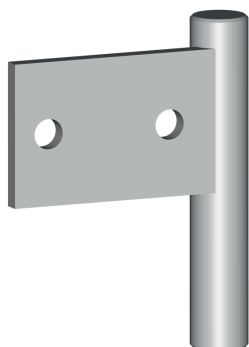
Hot galvanized steel - sheet 6, acc. to PN-EN ISO 1461 standard. The clamps - hot galvanized cast iron. Dividers on contact surfaces.

**Intended use:**

The earthing clamp UKU /40/ is designed for implementation of vertical earthing rods with flat or round earthing leads. Maximum width of fastened hoop iron 40 mm. Maximum diameter of round earth lead 10 mm. Manufactured in version for 16, 20 and 27 mm rod diameters.

Catalogue no.	KTM	Type	Dimensions [mm]			
			a	b	c	d
BK9006	0654-291-425-113	UKUż 16/40	70	70	40	16
BK9007	0654-291-425-213	UKUż 20/40	70	70	40	20
BK9008	0654-291-425-313	UKUż 27/40	70	70	40	27

### 2.3. UP .../50/... TYPE END EARTHING LINK



#### BK 9009 and BK 9010

**Material:**

Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Fastening and sealing component.

**Intended use:**

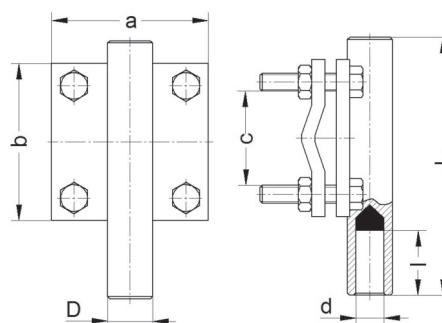
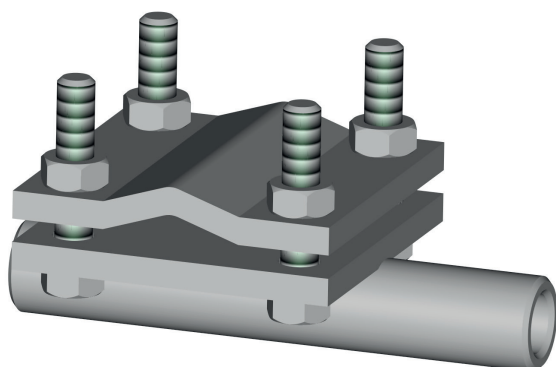
UP /50/2 earthing links are intended for implementation of earth rods and hoop iron connections.

**Mounting method:**

The connection is effected by drilling holes in the hoop iron and fastening it to the link fastening plane by means of bolts. Subsequently the link should be seated with its seat onto splines of the last earth electrode driven in and fastened by axial strike with hammer, until completed locking of shaped lock.

Catalogue no.	KTM	Type		Dimensions [mm]					
				a	b	D	d	L	I
BK9009	0654-291-016-002	UP 16/50/2	45	50	16	11	115	25	
BK9010	0654-291-020-002	UP 20/50/2	45	50	20	12,5	115	29	

2.4. UKP .../70/... TYPE END EARTHING LINK



BK 9011 and BK 9012

**Material:**

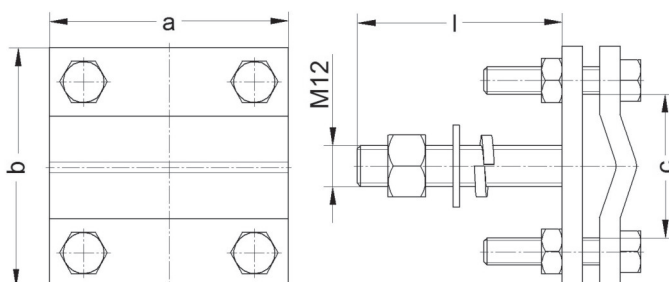
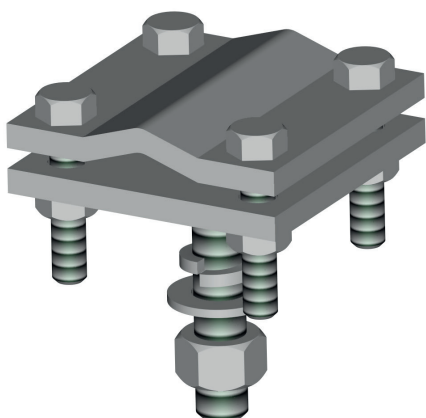
Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Fastening and sealing component.

**Intended use:**

UKP ... /170/4 type earthing links are intended for implementation of earth rods and hoop iron connections. They enable implementation of off-take with hoop iron having max. width 40 mm or with round earthing lead having max. diameter 10 mm, both within vertical, and horizontal planes. They do not require drilling holes in the hoop iron. Fastening is effected by tightening the set plate with screws - as in traditional earthing clamps. Subsequently the link should be seated with its seat onto splines of the last earth electrode driven in and fastened by axial strike with hammer, until completed locking of shaped lock.

Catalogue no.	KTM	Type	Dimensions [mm]					
			a	b	D	d	L	l
BK9011	0654-291-016-004	UKP 16/70/4	70	70	40	16	115	25
BK9012	0654-291-020-004	UKP 20/70/4	70	70	40	20	115	29

2.5. UKUd /40/12 TYPE WALL BUSHING CLAMP



BK 9013

**Material:**

Hot galvanized steel acc. to PN-EN ISO 1461 standard.

**NOTE:**

As an auxiliary equipment of GPK bushings, they enable implementation of water- and flame-proof passage of earthing system through rigid construction partitions (e.g. walls of buildings, transformer stations).

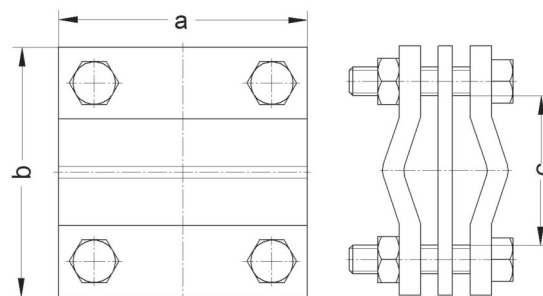
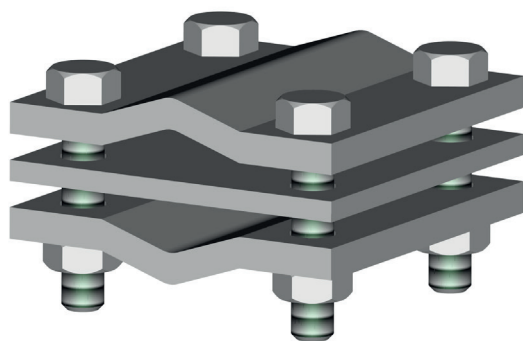
**Intended use:**

The UKUd 40/12 earthing clamp is intended for connecting flat or round earthing leads and fastening them to flat surfaces - e.g. walls of buildings. Range of earthing leads: hoop iron 40 mm max. width, wire Ø 10 mm max. diameter, both within vertical, and horizontal planes.

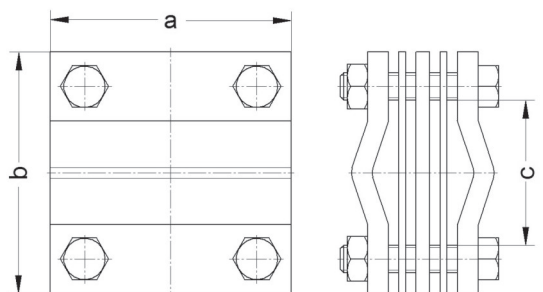
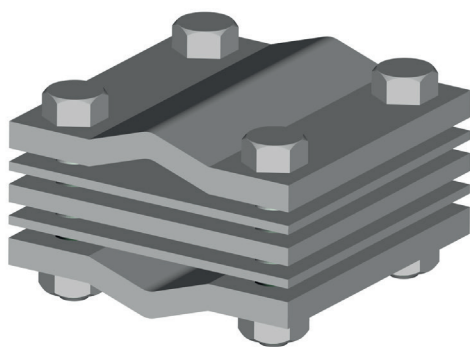
Catalogue no.	KTM	Type	Dimensions [mm]			
			a	b	c	L
BK 9013	0654-291-425-100	UKUd 40/12	70	70	40	60



2.6. UKU 10/40/4 AND UKU 10/40/4s UNIVERSAL EARTHING CLAMP



BK 9014



BK 9015

**Material:**

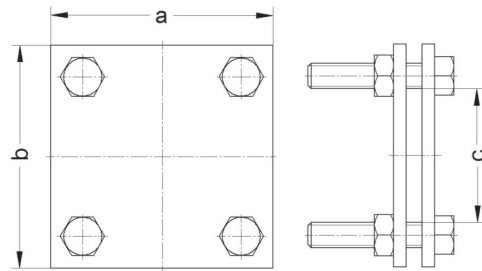
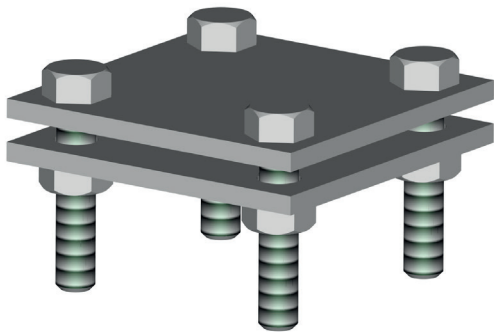
Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Dividers

**Intended use:**

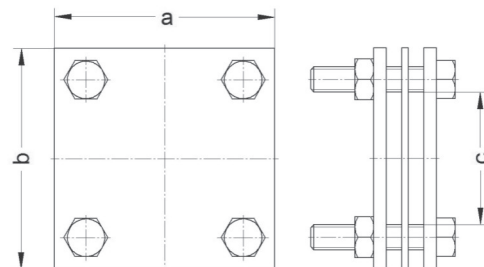
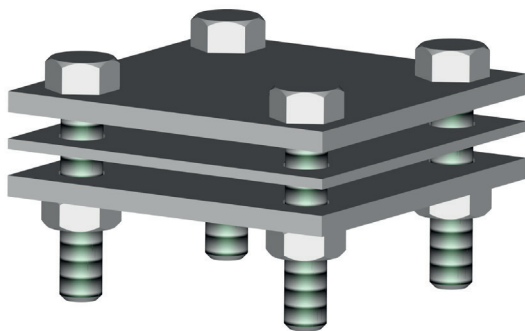
The UKU 10/40/4 earthing clamp is intended for connecting flat or round earthing leads with each other, in parallel or orthogonal arrangement, within implementation of extensive earthing systems.

Catalogue no.	KTM	Type	Dimensions [mm]		
			a	b	c
BK9014	0654-291-425-200	UKU 10/40/4	70	70	40
BK9015	0654-291-425-210	UKU 10/40/4s	70	70	40

2.7. UKU 40/2x4 AND UKU 40/2x4s FLAT CONNECTING HOLDERS



BK 9016



BK 9017

**Material:**

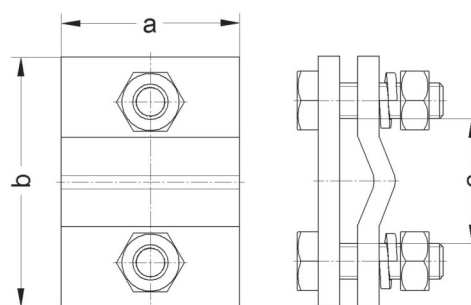
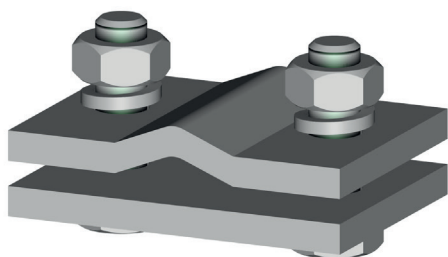
Hot galvanized steel acc. to PN-EN ISO 1461 standard.  
Dividers

**Intended use:**

The UKU 40/2x4 earthing clamp is intended for connecting flat or round earthing leads with each other, in parallel or orthogonal arrangement, within implementation of extensive earthing systems.

Catalogue no.	KTM	Type	Dimensions [mm]		
			a	b	c
BK9016	0654-291-425-300	UKU 40/2x4	70	70	40
BK9017	0654-291-425-310	UKU 40/2x4s	70	70	40

## 2.8. ZUS (żuk) TYPE EARTHING CLAMP



BK 9020

**Material:**

Hot galvanized steel acc. to PN-EN ISO 1461 standard.

**Intended use:**

Connecting overhead and underground earthing leads and implementation of earthing rod off-takes connection with hoop iron.

Catalogue no.	KTM	Type	Dimensions [mm]		
			a	b	c
BK9020	1131-690-100-030	ZUS 30	50	70	44

### 3. GROUND RESISTIVITY IMPROVEMENT

#### 3.1. AM2005 SUBSTANCE LOWERING RESISTIVITY OF GROUND

##### Intended use:

The agent lowering resistivity of ground and improving effectiveness of earth electrodes, used for earth pipes, particularly useful for soils of low resistance to striking and high resistivity (sand, gravel, etc.).

##### Properties of AM 2005 substance:

neutral to environment; safe for users; strong hygroscopic properties (absorbs humidity from ambient); water insoluble (does not prone to washing out), therefore it changes resistivity of soil in permanent manner, slightly changes reaction of soil, easing electrolytic dissociation within range of its action, without corrosive influences on earthing system elements.

##### Operating principle of AM2005 system:

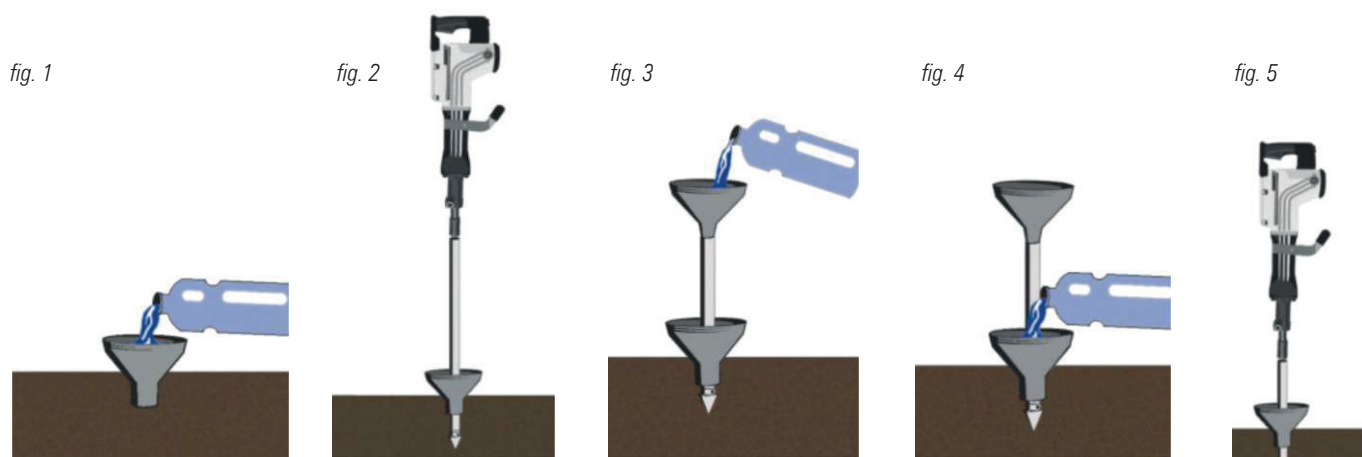
The AM 2005 substance constitutes integral part of URBS system. It is applied in depth of earthing in the form of water suspension, therefore it does not subject to hydromigration. The introduction proceed on two paths (as on diagram below, fig. 1 - fig. 5): a) to earth electrode interior (fig. 3), where by gravitation and impact resulting from striking, it is pushed out through openings in the URBS system spiked tip saturating vicinity of earthing, outside the earth electrode, b) by dripping along edge of opening created in effect of earthing driving in (fig. 4).

The substance introduces into vicinity of the earthing, saturates it. Because of strong hygroscopic properties, it absorbs humidity from environment and slightly changing reaction of soil, improves conduction ability in vicinity of the earthing.



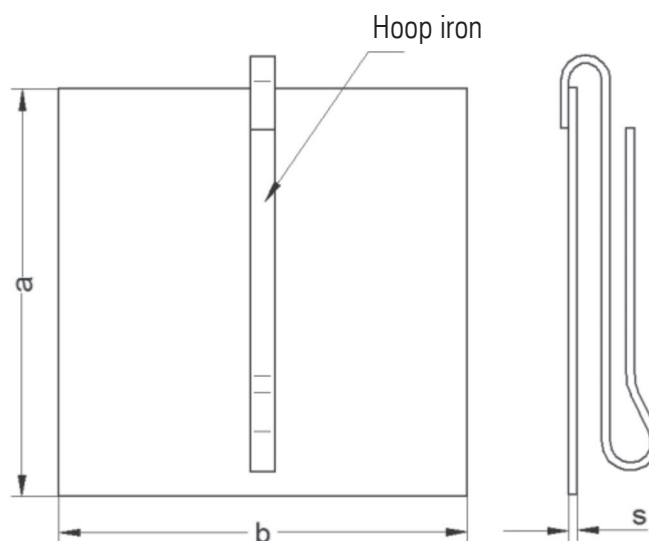
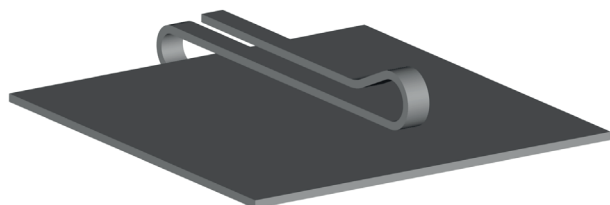
BK 9115 and BK 9116

This results in artificial increase of earth electrode diameter, contact surface area with soil, hence lowering earthing resistance value. The full effect of lowering resistance by over 30% compared to original value, is obtained after 3 to 4 weeks following treatment. The AM 2005 is sold in form of white powder. One package is intended for realisation of one earthing of arbitrary length.



## 4. HORIZONTAL EARTHING COMPONENTS

### 4.1. UPŁB TYPE PLATE EARTHING PLATE



BK 9120 to BK 9126

#### Material:

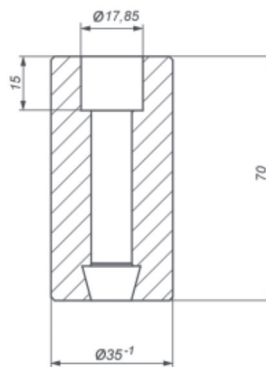
Hot galvanized steel acc. to PN-EN 93 E-04500 and PN-EN ISO 1461 standards.

#### Intended use:

Earthing plates are horizontal earthing elements. These elements are buried in soil and connected with earthing system by means of earthing leads.

Catalogue no.	KTM	Type	Dimensions [mm]			
			a	b	c	Hoop iron
BK9120	0654-489-230-110	UPŁB 1000/1000x2	1000	1000	3	30x4x2000
BK9121	0654-489-230-510	UPŁB 500/1000x2	500	1000	3	30x4x2000
BK9122	0654-489-230-550	UPŁB 500/500x2	500	500	3	30x4x2000
BK9123	0654-489-330-110	UPŁB 1000/1000x3	1000	1000	3	30x4x3000
BK9124	0654-489-330-510	UPŁB 500/1000x3	500	1000	3	30x4x3000
BK9125	0654-489-330-550	UPŁB 500/500x3	500	500	3	30x4x3000
BK9126	0654-489-340-510	UPŁB 500/1000x3/40	500	1000	3	40x5x3000

5.1. THE HEAD FOR MECHANICAL DRIVING EARTH ELECTRODES



**Material:**

Heat treated tool steel

**Mounting method:**

The head is fastened on standard chisels of impact hammers. The head is rigidly connected with the chisel, without possibility of stand-alone mounting or dismounting. The mallets are different, depending on type of earth electrodes, to which they are intended. The device fastened in the hammer is seated with its opening onto splines of earthing rod or pipe in case of URB earth electrodes, and following switching the hammer on, the probes are driven on required depth. In case of high striking resistance, plastic crimping of the head on the rod is possible. In such case several swinging movements of hammer around the chisel axis should be done, and then hammer pulled out of the splines.

**Intended use:**

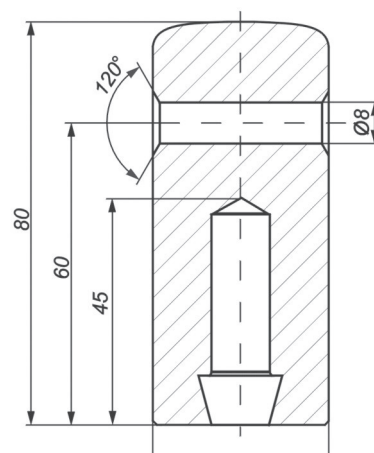
Driving of earthing rods and pipes by means of impact hammers.

Type	Head Method of fastening	KTM
GM Ø16	SDS - max	0625-489-001-016
GM Ø20		0625-489-001-020
GM Ø27 (URB)		0625-489-001-027
GM Ø16	Hexagon 6 kt 19	0625-489-002-016
GM Ø20		0625-489-002-020
GM Ø27 (URB)		0625-489-002-027
GM Ø16	Hexagon 6 kt 26	0625-489-003-016
GM Ø20		0625-489-003-020
GM Ø27 (URB)		0625-489-003-027

Ordering example: GM

GM	Ø16	6 kt 26
Mechanical head	Diameter of earth electrode	Fastening method (chisel type)

## 5.2. THE HEAD FOR MANUAL DRIVING EARTH ELECTRODES



### Material:

*Heat treated tool steel*

### Mounting method:

*The head has shape of sleeve with opening, depending on type of earth electrode being stricken, adapted to driving earth electrodes of 16, 20 mm diameter or pipe of 27 mm outer diameter. The head is seated with its opening on earthing rod splines or on the pipe necking. Supporting rod should be screwed into M12 side opening. The earth electrode is driven by striking with hand hammer onto upper, flat surface. Use of supporting rod provides protection of hands for person supporting the head, against missed strikes of the hammer.*

### Intended use:

*Driving of earthing rods and pipes by means of impact hammers.*

Ordering example:	
GR	Ø 16
GR	Ø 20
GR	Ø 27
Mechanical head	Diameter of earth electrode









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