

EQUIPMENT FOR OVERHEAD LINES


Maintenance work on overhead lines

Maintenance work on overhead lines under live conditions is safely performed worldwide for voltages up to 400 kV. The use of this technology provides considerable advantages for power supply authorities and consumers. For performing this type of work in existing installations in Germany, there are established procedures, tools and training standards as well as high safety requirements.

Working with insulated gloves

By using this procedure, the worker comes into direct contact with energised parts while relying on the protection provided by the insulated gloves and insulated sleeves as arm protection, if required. Using insulated gloves will additionally still require use of insulating materials, insulated tools and a suitable standing surface insulation, even if this work is performed on low voltage installations.

The Bavarian Power Supply Authority, E.ON Bayern, performs maintenance work on overhead lines under live conditions with voltages up to 36 kV.



Ref.: Fotostudio Köhler, Bayreuth/Germany

	Equipment	Nominal voltage U_N	Application	Page
	Insulated Gloves	up to 36 kV	For working on energised parts of installations Material: Natural India Rubber Dual-colour design allows for easy identification of cuts, cracks or other damage No fatigue or cramping of the hands due to soft rubber mixture	198
	Protective Leather Gloves		For use as an outer glove to protect insulated gloves against mechanical damage For use as operating glove for cleaning work and refilling of insulating oils Material: Robust neat's leather With safety strap for good fit	199
	Insulated Sleeves	up to 36 kV	For working on energised parts of installations Material: Natural India rubber Dual-colour design allows for easy identification of cuts, cracks or other damage Maximum coverage and thus optimum protection against contact with arm and shoulder area	200
	Insulated Blankets	up to 36 kV	For working on energised parts of installations Material: Natural India rubber Highly flexible with slots for hanging and locking purposes Available with and without slits for installation purposes	202
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Insulated Gloves

Nominal voltages up to 36 kV

EQUIPMENT FOR OVERHEAD LINES

DIN VDE 0682 Part 311 or DIN EN 60903

- For working on energised parts of installations
- Glove made of natural India rubber
- High wear comfort due to good fit
- No hand fatigue due to the soft rubber mixture
- Dual-colour design allows for easy identification of cuts, cracks or other damage
- Wide gauntlet for working with insulated sleeves



Ref.: Fotostudio Köhler, Bayreuth/Germany

Conditions:

The gloves have always to be checked for visible damage before use. Work at operating voltages exceeding 1 kV is allowed to be performed under the instructions of a qualified electrician in accordance with EN 50110-1 "Operation of Electrical Installations – Minimum Requirements", under observance of subclauses 6.3.1 to 6.3.12 and in accordance with EN 50110-2 "Operation of Electrical Installations – National Annexes".

Maintenance Test:

Insulated gloves have to be tested at least every 6 months. This requirement is valid for glove classes 1, 2, 3 and 4 and will also apply to new gloves if the electrical testing was done 6 months prior to use. The gloves will have to be tested before use and the testing will include visual inspection for punctures and surface damage while the glove is inflated and an electrical test for the dielectric strength and discharge currents of the insulating material. For insulated gloves, classes 00 and 0, a check for holes and a visual check are sufficient.



Measuring the back of the hand with a measuring tape

Glove Size

The glove size can be determined by measuring the circumference of the back of the hand.

Circumference	Size
20.3 cm	8
21.5 cm	8.5
22.8 cm	9
24.1 cm	9.5
25.4 cm	10
26.6 cm	10.5
27.9 cm	11
29.2 cm	11.5
30.4 cm	12

Example:

Insulated gloves for application in low voltages are required, $U_N = 400 \text{ V} / 50 \text{ Hz}$ at a circumference of the back of the hand = 24 cm.

Your order: Insulated Glove Type IHS 00, Size 9.5



Type	Class	Length	Operating voltage		Colour one-/two-coloured	Size Steps of 1/2
			ac	dc		
A Insulated Glove up to 1000 V						
IHS 00	00	356 mm	500 V	750 V	●	8 to 12
IHS 0	0	356 mm	1 000 V	1 500 V	● ●	8 to 12
Reference Data: Insulated Glove, Type _____, Size _____						
B Insulated Glove up to 36 kV						
IHS 1	1	406 mm	7.5 kV	11.5 kV	● ●	8 to 12
IHS 2	2	406 mm	17 kV	25.5 kV	● ●	8 to 12
IHS 3	3	406 mm	26.5 kV	39.75 kV	● ●	8 to 12
IHS 4	4	457 mm	36 kV	54 kV	● ●	9 to 12
Reference Data: Insulated Glove, Type _____, Size _____						

Second gloves made of 100% cotton available on request.



Leather glove for use as an outer glove, for protection against mechanical damage.

- For use as an outer glove to protect insulated gloves against mechanical damage
- For use as an operating glove for cleaning work and refilling of insulating oils
- Made of robust neat's leather
- High-quality tailoring, robust seams
- High wear comfort due to good fit
- With safety strap for good fit



Measuring the back of the hand with a measuring tape

Glove Size

The glove size can be determined by measuring the circumference of the back of the hand.

Circumference	Size
20.3 cm	8
22.8 cm	9
25.4 cm	10
27.9 cm	11
30.4 cm	12

Example:

An outer glove is required for an insulated glove Size 8, Class 00 or 0.

Your order: Protective Leather Glove Type LHS 254, Size 9

Note!

For use as outer gloves for insulated gloves, the size of the outer gloves must be selected one size larger than the insulated gloves.

Type	Length	Size Steps of 1
A Protective Leather Glove Type LHS 254		
Without safety strap for insulated gloves, Classes 00 and 0		
LHS 254	254 mm	8 to 12
Reference Data: Protective Leather Glove, Type LHS 254, Size _____		
B Protective Leather Glove Type LHS 356 SR		
With reflecting gauntlet for insulated gloves, Classes 1 to 4		
LHS 356 SR	356 mm	8 to 12
Reference Data: Protective Leather Glove, Type LHS 356 SR, Size _____		



Accessories for Insulated Gloves and Protective Leather Gloves

Bag for Storage and Transport

Made of jute (burlap) with fastening press buttons and safety carbine for fixing at belt of equipment.

Type	Dimension	Design
AT 229 508	229 x 508 mm	one internal pocket
AT 229 508 2IT	229 x 508 mm	two separate internal pockets
Reference Data: Bag for Storage and Transport, Type _____		



Insulated Sleeves

Nominal voltages up to 36 kV

EQUIPMENT FOR OVERHEAD LINES

DIN VDE 0682 Part 312 or DIN EN 60984

- For working on energised parts of installations
- Insulated sleeves made of natural India rubber
- High wear comfort due to good fit
- Maximum coverage and thus optimum protection against contact with arm and shoulder area
- Dual-colour design allows for easy identification of cuts, cracks or other damage



Ref.: Fotostudio Köhler, Bayreuth/Germany

Conditions:

The sleeves must be checked for visible damage before use. Work at operating voltages exceeding 1 kV is allowed to be performed under the instructions of a qualified electrician in accordance with EN 50110-1 "Operation of Electrical Installations – Minimum Requirements", under observance of subclauses 6.3.1 to 6.3.12 and in accordance with EN 50110-2 "Operation of Electrical Installations – National Annexes".

Maintenance Test:

The insulated sleeves have to be tested at least every 12 months. If the last electrical test has been performed more than 6 months prior to use, the sleeves should be tested before use even if these sleeves are still new and have never been used. For class 0 sleeves, testing is required every 6 months and includes a visual inspection and electrical routine testing.



Shoulder support and screw fixing for safe positioning and fit of the insulated gloves.

Example:

Insulated sleeves are required for application in low voltage systems, $U_N = 400 \text{ V} / 50 \text{ Hz}$.

Your order: Insulated Sleeves Type IAE 0



Type	Class	Length	Operating voltage		Colour one-/two-coloured
			ac	dc	
A Insulated Sleeves up to 1000 V, straight					
IAE 0	0	667 mm	1 000 V	1 500 V	● ●
Reference Data: Insulated Sleeves, Type _____					
B Insulated Sleeves up to 36 kV, angled					
IAE 1	1	673 mm	7.5 kV	11.5 kV	● ●
IAE 2	2	673 mm	17 kV	25.5 kV	● ●
IAE 3	3	673 mm	26.5 kV	39.75 kV	● ●
IAE 4	4	673 mm	36 kV	54 kV	● ●
Reference Data: Insulated Sleeves, Type _____					

Note: Other lengths and types available on request.

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Shoulder Support

For insulated sleeves.

Type

SH IAE

Reference Data: Shoulder Support, Type SH IAE

**Supporting Straps**

For extending the shoulder supports (4 pcs. required).

Type

TR IAE

Length

343 mm

VPE

2

Reference Data: Supporting Straps, Type TR IAE

**Screw Fixing**

For shoulder supports and supporting straps.

Type

SF IAE

VPE

4

Reference Data: Screw Fixing, Type SF IAE

**Bag for Storage and Transport**

Made of jute (burlap) with fastening press buttons and with safety carbine for fixing at the belt or equipment.

Type

AT 836 241

Dimension

836 x 241 mm

Reference Data: Bag for Storage and Transport, Type AT 836 241



Insulated Blankets

Nominal voltages up to 36 kV

EQUIPMENT FOR OVERHEAD LINES

DIN VDE 0682 Part 511 or prEN 61111

- For covering energised parts of installations at operating voltage
- Insulated blanket made of natural India rubber
- Highly flexible with slots for hanging and locking purposes
- Available with and without slits for installation purposes



Ref.: Fotostudio Köhler, Bayreuth/Germany

Conditions:

Insulated blankets must always be checked for damage before use. The use at operating voltages exceeding 1 kV is allowed to be performed under the instructions of a qualified electrician in accordance with EN 50110-1 "Operation of Electrical Installations – Minimum Requirements", under observance of subclauses 6.3.1 to 6.3.12 and in accordance with EN 50110-2 "Operation of Electrical Installations – National Annexes".



Type	Class	Dimension	Operating voltage		Number of marginal holes	Colour
			ac	dc		
A Insulated Blanket, without slit						
IAM 4 559 559	4	559 x 559 mm	36 kV	54 kV	28	●
IAM 4 686 914	4	686 x 914 mm	36 kV	54 kV	6	●
IAM 4 914 914	4	914 x 914 mm	36 kV	54 kV	6	●
Reference Data: Insulated Blankets, without slits, Type _____						

B Insulated Blanket, with slit						
IAMG 4 559 559	4	559 x 559 mm	36 kV	54 kV	28	●
IAMG 4 914 914	4	914 x 914 mm	36 kV	54 kV	28	●
Reference Data: Insulated Blankets, with slits, Type _____						

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**Holding Clamp**

For fixing insulated blankets.

Type	Length	Opening range	Material	Colour
HK 127	241 mm	127 mm	PVC	●

Reference Data: Holding Clamp, plastic, Type HK 127

**Bag for Storage and Transport**

For rolling in insulated blankets.

Type	Dimension	Material	Max. capacity	Colour
AT 1371 1168	1371 x 1168 mm	water-repellent cotton fabric	4 mats	●

Reference Data: Bag for Storage and Transport, Type AT 1371 1168

**Container for Storage and Transport**

For insulated blankets and holding clamps.

Type	Dimension	Material	Max. capacity	Colour
AB 152 940	152 x 940 mm	plastic	3 mats	●
AB 178 940	178 x 940 mm	plastic	6 mats	●

Reference Data: Container for Storage and Transport, Type _____



Insulating Line Hose

Nominal voltages up to 26.5 kV

EQUIPMENT FOR OVERHEAD LINES

DIN VDE 0682 Part 513 or DIN EN 61479

- For covering energised overhead lines
- Line hoses made of natural India rubber
- Resistant against UV and ozone radiation
- Highly flexible
- Insulating line hose with and without coupling for continuous installation



Ref.: Fotostudio Köhler, Bayreuth/Germany

Conditions:

Line hoses must always be checked for visible damage before use. The use at operating voltages exceeding 1 kV is allowed to be performed under the instructions of a qualified electrician in accordance with EN 50110-1 "Operation of Electrical Installations – Minimum Requirements", under observance of subclauses 6.3.1 to 6.3.12 and in accordance with EN 50110-2 "Operation of Electrical Installations – National Annexes".

Type	Class	Dimension Ø x l	Operating voltage ac	Colour
A Insulating Line Hose, without coupling				
ILSA 2 31 1820	2	31.5 x 1820 mm	17 kV	●
ILSA 2 31 1372	2	31.5 x 1372 mm	17 kV	●
ILSA 2 31 915	2	31.5 x 915 mm	17 kV	●
ILSA 3 40 1820	3	40 x 1820 mm	26.5 kV	●
ILSA 3 40 1372	3	40 x 1372 mm	26.5 kV	●
ILSA 3 40 915	3	40 x 915 mm	26.5 kV	●

Reference Data: Insulating Line Hose without coupling, Type _____



B Insulating Line Hose, with coupling				
ILSAK 2 31 1820	2	31.5 x 1820 mm	17 kV	●
ILSAK 2 31 1372	2	31.5 x 1372 mm	17 kV	●
ILSAK 2 31 915	2	31.5 x 915 mm	17 kV	●
ILSAK 3 40 1820	3	40 x 1820 mm	26.5 kV	●
ILSAK 3 40 1372	3	40 x 1372 mm	26.5 kV	●
ILSAK 3 40 915	3	40 x 915 mm	26.5 kV	●

Reference Data: Insulating Line Hose with coupling, Type _____



Accessories for Insulating Line Hose

Bag for Storage and Transport

Robust jute (burlap) bag with safety carbine at the traction cable



Type	Dimension	Max. capacity
AT 300 1520	300 x 1520 mm	6 covers for overhead conductors

Reference Data: Bag for Storage and Transport, Type AT 300 1520